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An Efficient Factory Purchasing System

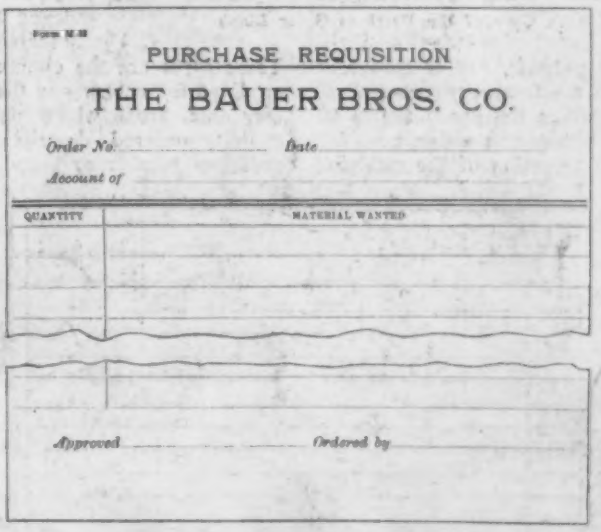
A Simple Method of Recording Orders, Keeping Track of Deliveries and Prices and Making Quick Comparisons

BY WILLIAM GUGENHEIM*

The purchasing system described in this article has been in active use for several years, and has been developed to meet the demands of the busy man, who may desire to keep it up himself or put it in the hands of the regular book-keeper, stenographer or stock clerk, and not make it a burden for anyone. The convenience and satisfaction realized for the few minutes' time required each day for its maintenance, the time saved in looking up former purchases, dates, quantities, prices, terms, etc. are unusual.

All requisitions for material to be purchased should be made out on a requisition blank by the storekeeper. The blanks should provide space for the date, a column for the quantity required or suggested and for a description of the article or articles. They should be signed by the party wanting the material and space provided for the signature or approval of the manager. A suggested form for a requisition blank is shown in Fig. 1, but one can easily be arranged to meet any conditions. After the purchase orders have been made out, the requisitions can be conveniently filed by months on ordinary arch files, for reference when required.

Figs. 2 and 3 show a convenient triplicate form for the purchase orders, consisting of an original and two carbon copies. These forms can be purchased in rolls, for use in an autographic register, as shown, or padded in sets to be written on the typewriter. The autographic



Form M-B

PURCHASE REQUISITION

THE BAUER BROS. CO.

Order No. ..... *Date* .....

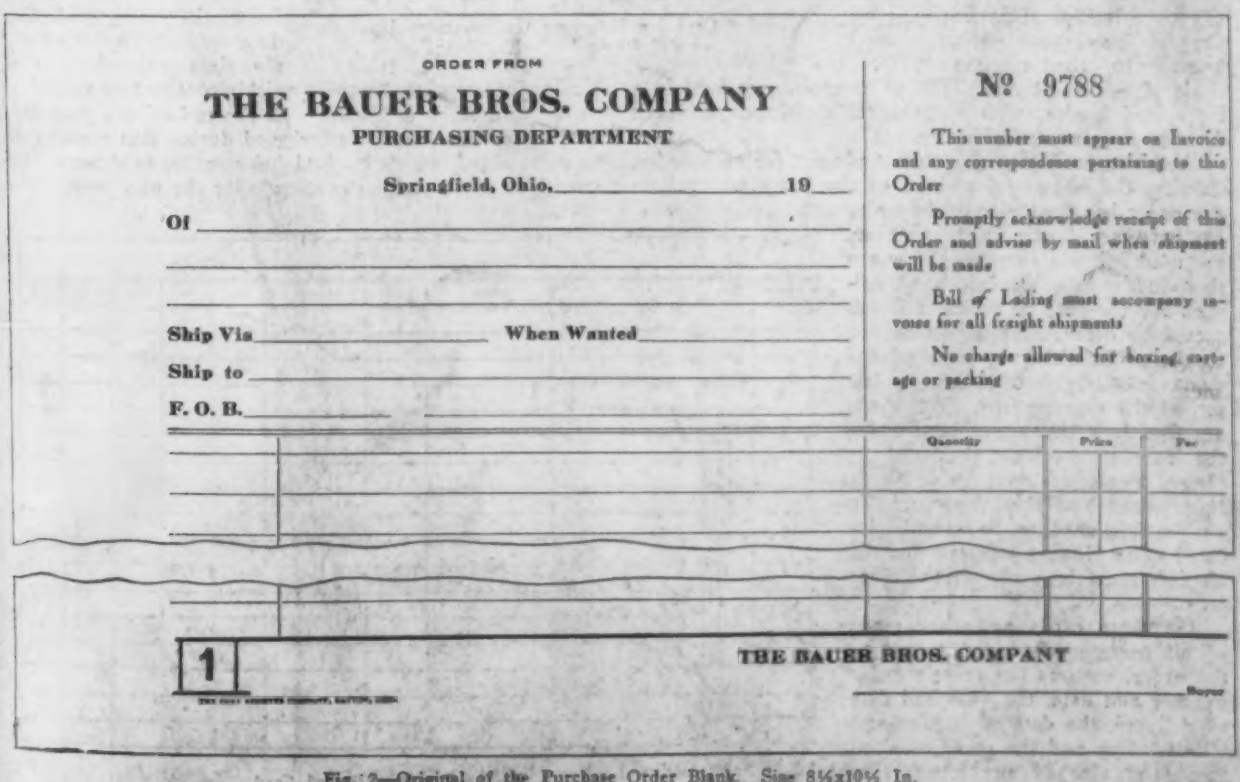
Account of .....

QUANTITY	MATERIAL WANTED

Approved ..... *Ordered by* .....

Fig. 1—The Requisition Blank

*Buyer for the Bauer Bros. Company, builder of oil mill machinery and grinding machines, Springfield, Ohio.



ORDER FROM

THE BAUER BROS. COMPANY

PURCHASING DEPARTMENT

Springfield, Ohio, _____ 19__

Of _____

Ship Via _____ When Wanted _____

Ship to _____

F. O. B. _____

No 9788

This number must appear on Invoice and any correspondence pertaining to this Order

Promptly acknowledge receipt of this Order and advise by mail when shipment will be made

Bill of Lading must accompany invoice for all freight shipments

No charge allowed for boxing, cartage or packing

		Quantity	Price		Per

1

THE BAUER BROS. COMPANY

_____ Buyer

Fig. 2—Original of the Purchase Order Blank. Size 8½x10½ In.

ORDERED BY

No. 9788

THE BAUER BROS. COMPANY

RECEIVER'S CHECK COPY PURCHASING DEPARTMENT

Springfield, Ohio, _____ 19__

Of _____

Ship Via _____ When Wanted _____

Ship to _____

F. O. B. _____

Quantity Rec'd	
Count	
Weigh	
Measure	
Gauge	

3	Date Received	Received Via	Freight	Checked by

Fig. 3—The Receiving Clerk's Copy of the Purchase Order Blank

register is convenient for this purpose, and is always at hand, ready for use. Fig. 2 is the first copy, or original, to be sent to the party from whom the goods are to be purchased. The office copy is retained as a duplicate, for filing and reference. Fig. 3 is a portion of the receiving clerk's check copy, which is filled out when the goods are received, and is used for checking invoices by the book-keeper.

It will be noticed that the receiver's check copy has a perforated margin at the right which contains the quantity ordered and the price. This may be torn off, so that the receiver will be obliged to count, weigh, measure or gauge the material received in order to enter the quantity on this slip. This also prevents prices paid being known to the receiving clerk, if this is desired. The office copies are kept in a loose leaf binder, with alphabetical divisions, and each division is in numerical order.

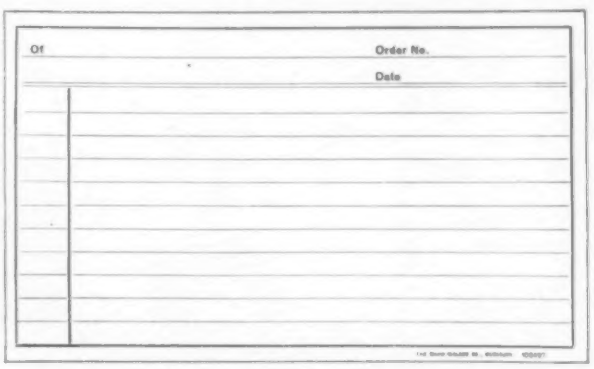


Fig. 4—The Tickler Card for Following Up Purchases Until the Goods are Delivered

A tickler card, Fig. 4, is then made out for each order, showing the name and address of the party with whom the order has been placed, the order number and date. Cards 3 x 5 in. are used for this purpose. They are then indexed in the left hand column for the date on which it is expected to hear something in regard to the order either by acknowledgment, invoice, bill-of-lading or letter, as the case may be. The cards are filed in a tray or cabinet, under the date marked on the card as above, a set of date guide cards being used for this purpose. To enable this card to be quickly located after filing, a memorandum of its date must be made on the office copy.

On these cards notes are made of all correspondence in regard to the order, such as the seller's order number and date, the promised date of delivery, the date of invoice and bill-of-lading and the route of shipment and also of any letters that may have to be written hurrying delivery or for other reasons. By the use of this "future date" file, the cards for all orders which should have attention come up automatically each day and thus none can be overlooked. By making notes on the cards it is not necessary to look up the correspondence, as it is all shown. They should be filed ahead from time to time, as required, until the material is received, when the card is of no further value and should be destroyed.

When the material is received, a record of the receipt is made on the receiver's check copy, Fig. 3, and turned in to the office promptly. From these slips the invoices are checked, and the corresponding office copy removed from the binder. Both copies are then filed numerically in a loose leaf binder without index, and become a permanent record.

The Purchase Record

After the goods have been received, all purchase orders are entered on the purchase record cards, Fig. 5, which are indexed by the name of the material purchased, and filed alphabetically. These cards are the climax of the system. Columns are provided for entering in the order named, the order number, date, from whom purchased, the seller's location, quantity ordered, description of material, such as size, catalogue number or brand, price per unit of measure or count, terms, date received, and amount of transportation charges, if paid by the purchaser. Each subsequent order for the same material is entered on the same card, one being made out as required for each different article or class of material purchased.

There are quite a number of uses for these cards for reference purposes. If, for example, it is desired to see where the last lot of cement coated nails came from, the price paid, the date or quantity received, the sizes ordered, or any similar information, it can be quickly obtained by referring to the card marked "Nails." At the end of any year, the quantity of every article purchased during that period can be ascertained, which is good information in determining quantities when making contracts for the new year. The

Order No.	Date	Of	Location	Quantity	Description	Price	Per	Terms	Date Rec'd	Freight

Fig. 5—The Purchase Record Card

cards help the book-keeper as a reference for the terms on former invoices, or from other manufacturers and jobbers, and whether the freight is allowed when it is not shown on every invoice. At inventory times the cards will save time in pricing the inventory.

Fig. 6 shows an impression of a rubber stamp form for stamping invoices, and for use when checking them from the receiver's check copy. When the invoice is paid the date of payment, the voucher or check number and the account to which the amount is to be charged can be noted on the bill.

INV. REC.....
GOODS REC.....
PRICE .....
FREIGHT .....
DISCOUNT .....
EXTENSION .....
VOUCHERED .....
VOUCHER NO.....
CHARGE .....

Fig. 6—Impression of the Rubber Stamp Used for Checking Invoices

In operation the system is very simple, and will save much time and money in the course of the year. Other features can be added if it is desired to expand the system. Among these are a card index for contracts and quotations, which are usually filed by subjects, and one for catalogues and other printed matter, which can be filed by the name of the vendor. This latter index should be cross indexed by the name of the articles described in the printed matter.

International Safety and Sanitation Exposition

The American Museum of Safety, 29 West Thirty-ninth street, New York, announces that under its auspices the first International Exposition of Safety and Sanitation ever held in America will take place in that city, December 11 to 20, 1913. Safety and health in every branch of American industrial life, manufacturing, trade, transportation on land and sea, business, engineering in all of their subdivisions, will be represented at this exposition. It will be the first step toward making a representative exhibition of the progress of safety and preventive methods in America. There will be no limit to the scope of the exposition. It will embrace everything devoted to safety, health, sanitation, accident prevention, welfare and the advancement of the science of industry. By a special act of Congress exhibits from Europe and other foreign countries are to be admitted free of duty. By way of stimulating interest in this exposition, the American Museum of Safety says:

"European employers have cut their accident and death rate in half by a persistent campaign for safety. There are 21 museums of safety in Europe. All of these various museums will contribute to the American exposition. In the United States every year 40,000 workers are killed and 2,000,000 are injured, while 3,000,000 are ill from preventable causes. A conservative estimate of the wasted wage-earning capacity of the latter for one year is $400,000,000. Thus it can be seen what America has to accomplish in the way of conserving human resources. The main object of the First International Exposition of Safety and Sanitation is to point the way."

The Lehigh Valley Railroad is continuing the use of specially heavy rails on sharp curves and steep grades where rail wear is severe. The rail is a 110-lb. section of the same hight and base width as the 100-lb. standard, but the web is heavier, 19/32 in. instead of 9/16 in., and the head larger and deeper, 1⅞ in. deep instead of 1 9/16 in. A six-bolt joint is used and a special outside splice bar extends along the side of the rail head for additional depth and rigidity. There are now 77 miles of track laid with this rail.

The Trussed Steel Concrete Company, Youngstown, Ohio, has received a large order for steel sash for a new building for the Ypsilanti Reed Furniture Company, Ionia, Mich.

Virginia Furnaces Ask Lower Northern Rates

WASHINGTON, D. C., July 15, 1913.—Another important case attacking the freight rate on pig iron has been filed with the Interstate Commerce Commission. The Low Moor Iron Company, Alleghany Ore & Iron Company, Oriskany Ore & Iron Corporation, Princess Furnace Company, Virginia Iron, Coal & Coke Company and Pulaski Iron Company, making the group known as the Virginia furnaces, have united in a complaint against the Chesapeake & Ohio, Southern Pennsylvania and other railroads, charging that the rates on pig iron to Northern destinations are excessive and discriminate against these furnaces in favor of furnaces located in New York and Pennsylvania. The complaint intimates that the rates are excessive because of the large proportion demanded and received by the Pennsylvania Railroad.

The present rates on pig iron in carloads from the Virginia furnaces via either Hagerstown or Potomac yards to Northern destinations are set forth in the complaint as follows:

To	Rate	To	Rate
Harrisburg, Pa.	$2.40	Trenton, N. J.	$3.25
Baltimore, Md.	2.45	Newark, N. J.	3.35
Wilmington, Del.	3.00	Jersey City, N. J.	3.35
Philadelphia, Pa.	3.00	New York City	3.95
Coatesville, Pa.	3.00	Boston, Mass.	3.75
Reading, Pa.	3.00		

The following table is given showing the difference in the rates accorded the Virginia furnaces as against competing furnaces:

	To Baltimore		To Philadelphia		To New York		To Boston	
From	Miles	Rate	Miles	Rate	Miles	Rate	Miles	Rate
Low Moor, Va.	255	$2.45	351	$3.00	442	$3.95	653	$3.75
Roanoke, Va.	319	2.45	362	3.00	453	3.95	717	3.75
Pittsburgh, Pa.	329	2.15	348	2.25	439	2.45	652	2.65
Emporium, Pa.	275	1.80	294	1.80	385	2.00	599	2.45
Saxton, Pa.	207	1.50	225	1.60	316	2.05	529	2.35
Punxsutawney, Pa.	265	2.15	284	2.25	375	2.45	588	2.65
Youngstown, O.	395	2.55	414	2.65	505	2.85	727	3.05
Buffalo, N. Y.	395	2.45	416	2.45	411	2.45	498	2.45

The complaint states that the principal competitors of Virginia pig-iron makers have furnaces located at Pittsburgh, Emporium, Saxton, Punxsutawney, Josephine, Everett, Youngstown and Buffalo. Low Moor and Roanoke, Va., are two of the principal shipping points of the Virginia furnaces—one on the Chesapeake & Ohio and the other on the Norfolk & Western—and in the foregoing table they are used as representative of those furnaces in showing the distance and rates from the various furnaces in Virginia, Pennsylvania, Ohio and New York competing for business in Baltimore, Philadelphia, New York and Boston, these four cities being representative destinations. The complaint continues: "An examination of the table indicates that, generally speaking, the rates from Virginia furnaces to destinations substantially equally distant from furnaces in Pennsylvania and New York are from 30 to 50 per cent. higher."

W. L. C.

Reference is made in London papers to the testimony taken there in the vanadium steel suit of the Churchward International Steel Syndicate, New York, against the Carnegie Steel Company. Professor Arnold, J. E. Stead, and F. W. Harbord all supported the contention of the defendant that the value of vanadium was discovered and vanadium steel manufactured for some years prior to the registration of patents in 1906, on which the suit is brought. Professor Arnold was conducting researches as early as 1880, and in 1904 the results of these were extensively published, placing the information before steel makers generally.

The William B. Pollock Company, Youngstown, Ohio, which has the contract for the blast furnace work and ladle cars for the Broken Hill Proprietary Company in New South Wales, Australia, will not have the material ready for shipment before the later part of August. It is probable that a special train will be used to transport the equipment to Philadelphia, where it will be loaded on a steamer for Australia. As yet the exact way in which the material is to be handled by the railroads has not been planned.

The Wilson Steel Products Company, Forty-ninth street and Southwestern avenue, Chicago, is building a warehouse. The company makes a concrete-coated wire nail.

New Molding Machine for Large Work

A new combination jar, roll-over, pattern drawing and swing-out molding machine designed either for large molds or cores has been brought out by the U. S. Molding Machine Company, Cleveland, Ohio. An important feature of this machine is its simplicity of construction, being, it is claimed, one of the simplest made for completely finishing the mold so that it is ready to be taken away on a crane. The machine is equipped with one air cylinder, which is used both for jarring the mold and drawing the pattern. No complicated cocks or valves are used for controlling the supply of air. The machine has two common stop cocks, one of which is for the inlet and the other is for the exhaust. The trunnions move loosely on upright shafts and are provided on the inside with two hardened shoes, which are clamped against the shafts with two handwheels. The shoes hold the trunnions tightly against the shafts when the flask is raised to be turned over. Two stops are provided on the shafts, these being set according to the hight of the flask, to prevent the raising of the flask higher than necessary so that air is not wasted.

The plate which holds the pattern is adjustable vertically on the trunnions so that the axis is near the center of gravity when the mold is being turned over. The adjustment of the plate is made with studs and double nuts. Two taper pins, one on each trunnion, are used to hold the plates and flask in position after they are turned over. All wearing parts are well protected from sand and the two guides on either side of the cylinder run in oil valves so that sand cannot interfere with the operation of the machine. These guides run in long bronze bushings. The swinging arm is ball bearing, so that a flask of any size or weight can be swung around with little exertion. All parts are held together with studs and double nuts and all joints are machined to an airtight fit. No gaskets are used, and in other respects the construction has been studied to reduce the liability to wear.

A view of the machine with pattern mounted is given in Fig. 1. In operation the flask is placed on the machine in the usual way and filled with sand and jarred. The top of the mold is next butted off by hand and the bottom board is placed in position and clamped, after which the exhaust pipe is closed. The flask is raised until the trunnions strike the stops on the shafts, when the trunnions are made tight to the shafts by the handwheels and the air-inlet cock is closed, allowing the air to exhaust through the waste opening in the cock and causing the lowering of the plunger and plunger plate. The mold is then rolled over as shown in Fig. 2, after which the swinging arm is swung over the plunger plate. Air is then admitted into the cylinder and the plunger raises the swinging arm until is strikes the flask. Then the clamps are removed, the vibrator is put into action, the air cock is closed and the exhaust is opened, causing the mold to be slowly drawn away from the pattern, as shown in Fig. 3. The arm is next swung around with the mold from underneath the pattern, as shown in Fig. 4, and the mold is ready to be taken away.

The machine is made in three sizes to take in flasks from 20 to 45 in. in length, inside measurement, and up to

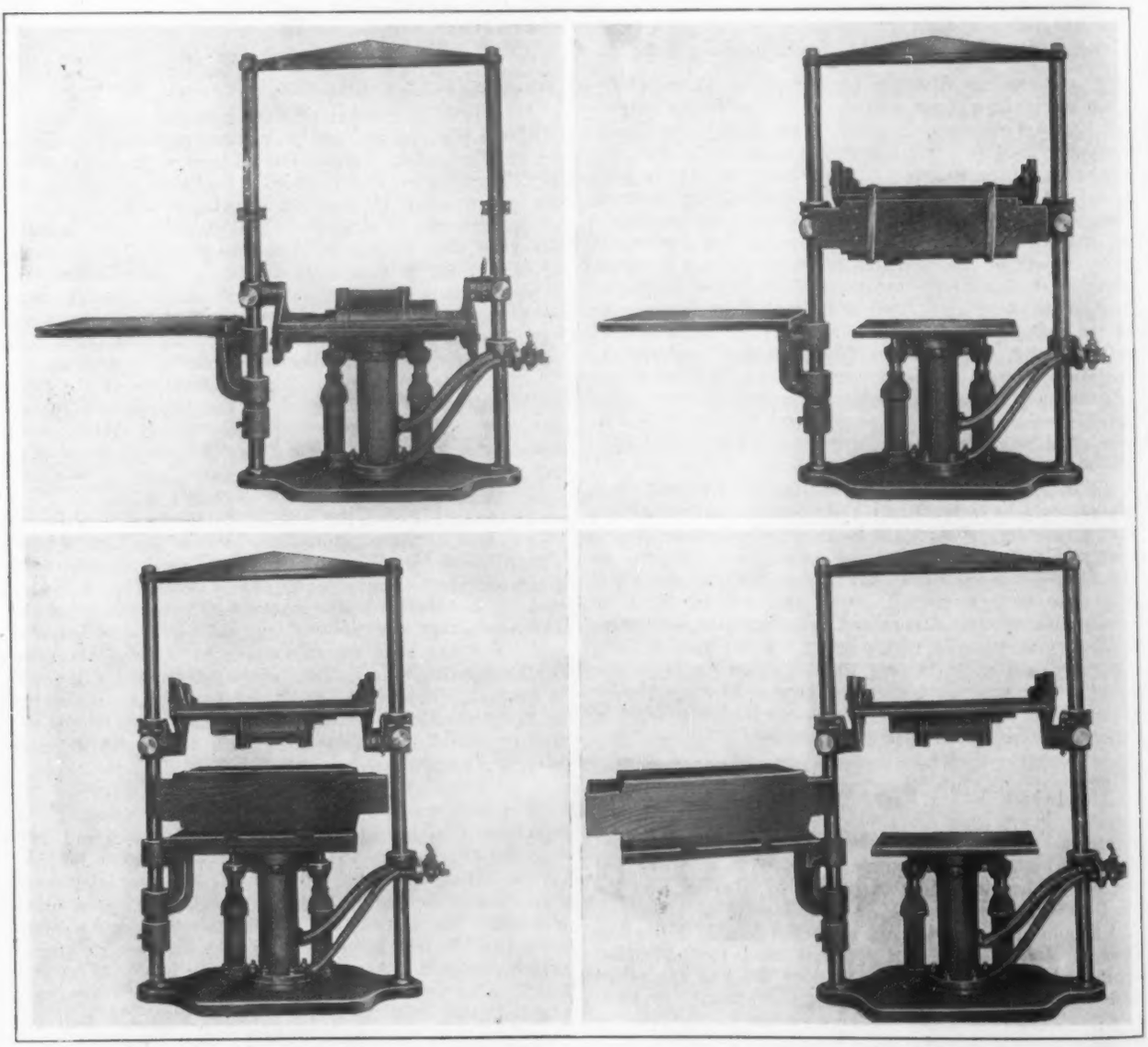


Fig. 1—The Pattern Mounted
Fig. 3—Drawing the Pattern

Fig. 2—The Mold Rolled
Fig. 4—The Mold Completed

VIEW SHOWING THE SUCCESSIVE STAGES IN THE OPERATION OF A NEW COMBINATION JAR, ROLL-OVER, PATTERN DRAWING AND SWING-OUT MOLDING MACHINE

36 in. in width. The maximum pattern draw is 18 in. The air cylinder is from 4 to 8 in. in diameter, according to the size of the machine, and has a lift ranging from 10 to 18 in.

Youngstown Sheet & Tube Company's Growth

On Thursday, July 10, a fourth furnace in the new open-hearth steel plant of the Youngstown Sheet & Tube Company, Youngstown, Ohio, was put in operation. The other two furnaces will probably start early in August. Some good records are already being made at this plant. On July 9 three furnaces turned out 606 tons of steel. The 44-in blooming mill, built by the William Tod Company, has been in operation for several weeks. The engine for driving this mill was built by the Mesta Machine Company. Both are working most satisfactorily. This mill is intended to serve the open-hearth works, but is connected to the present billet and sheet bar mills, so that either open-hearth or Bessemer billets and sheet bars can be rolled on it or on the old mill which serves the Bessemer department. The ingot stripping for both the open-hearth and Bessemer plants will be done in one building, this also facilitating the rolling of Bessemer or open-hearth steel on either mill. This new steel plant has six 100-ton furnaces and is expected to turn out 1000 tons per day. The Bessemer plant has two converters with a capacity of 2500 tons per day of Bessemer ingots. The total is thus 3500 tons per day for both plants, giving the company an annual capacity of 1,050,000 tons of steel ingots.

The new blast furnace D will be turned over to the company about August 1, and will go in blast shortly after. The four blast furnaces will make about 2000 tons of iron per day. The company is also taking the entire output of Mary furnace of the Ohio Iron & Steel Company for this year under a contract made some time ago. It is probable that later on it will build a fifth blast furnace, as it will need at least 2500 tons of iron per day. Before this furnace is undertaken, however, it is likely that the company will build by-product coke ovens at Youngstown to furnish its supply of coke. Such a proposition has not been actively taken up as yet. Being in line with the company's developments, it may be expected to take shape at a reasonably early day.

Six Months' Connellsville Coke Production

The coke production and shipments for the first half of 1913, says the Courier, Connellsville, Pa., show a rate of over 21,000,000 tons annually, but the record for the year will probably fall under this. By quarters, the production and shipments for the year were as follows, in tons of 2000 lb.

Quarter	Production	Shipments
First	5,361,838	5,312,775
Second	5,295,200	5,310,385
Totals	10,657,038	10,623,160

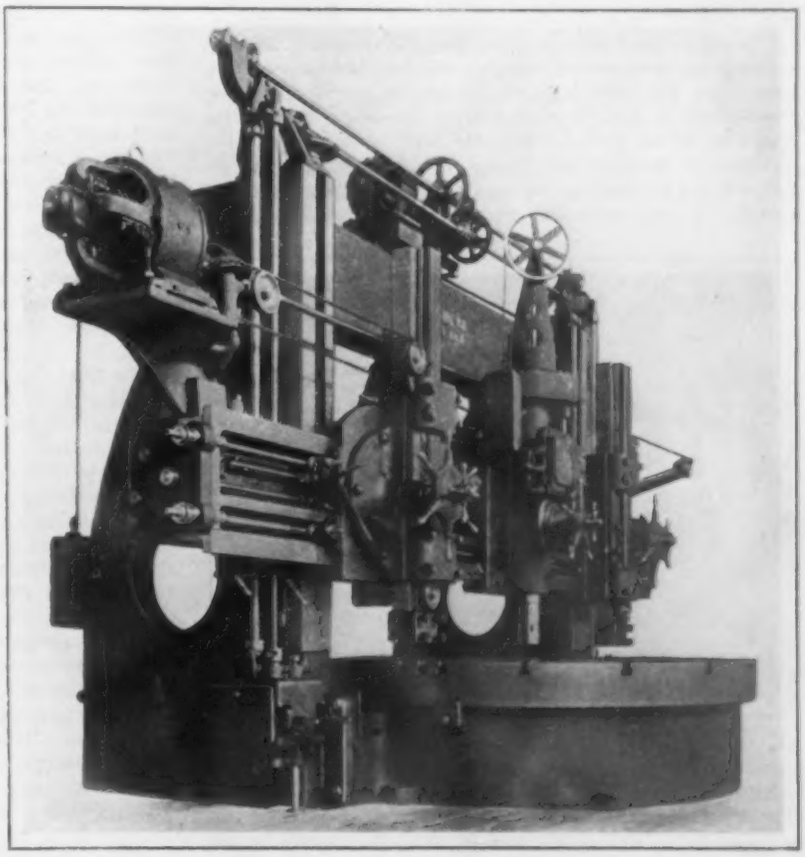
The record by months shows a sustained strength to the trade that probably explains the insistent demand of the operators for a fair price for their product. The record is as follows, in tons of 2000 lb.:

Month	Production	Shipments
January	1,867,336	1,868,149
February	1,716,525	1,715,917
March	1,777,977	1,728,709
April	1,770,000	1,792,766
May	1,823,673	1,817,804
June	1,701,527	1,699,815
Totals	10,657,038	10,623,160

Boring Mill with Rapid Power Travel

The application of separate motor drive on the 10-ft. boring mill built by the Betts Machine Company, Wilmington, Del., has resulted in the providing of rapid power travel. Another feature of this machine is the use of an all-geared feed to the heads. This arrangement, it is emphasized, enables the workman without moving from the head to operate the quick power travel to head and spindle in either direction, to change from power travel to feed and vice versa. The feeds can be operated in either direction and the tools set to size the work.

The machine is equipped with a motor-driven central boring head, which has a revolving spindle with independent driving and feeding mechanism. A limited lateral movement is provided so that work other than central boring can be handled. The machine swings 124 in. and will accommodate work 62 in. under the tool-holders.



A 10-Ft. Motor-Driven Boring Mill Equipped with Power Rapid Travel and All-Geared Feed for the Heads

Westinghouse motor drive is used by the machine, separate motors being provided for the main drive, the central boring head and for the elevating cross rail and for the power travel. The main driving motor is a 20-hp. unit, having a speed range of 400-1200 r.p.m., while the central boring head is driven by a 5-hp. motor, with speed range varying from 400-1600 r.p.m. For elevating the cross-rail and supplying the power travel, a 5-hp. motor running at a constant speed of 1130 r.p.m. is employed. The total weight of the machine, including the motors, is 80,000 lb.

A company has been formed with a capital of $800,000 to acquire control of the waterfalls at Arrens (Hautes-Pyrénées), capable of generating 7000 hp. of electricity, and to undertake the electric smelting of zinc ore. From 16,000 to 18,000 tons of ore is mined there yearly, and it is proposed to manufacture white zinc, for which there is a good demand in France. Previously zinc ore has been treated in coal-fired furnaces at a considerable cost, the coal and ore mines being widely separated.

The Ziv Steel & Wire Company, Chicago, which has been doing a brokerage business at 180 North Dearborn street, has been incorporated with a capital stock of $2500 by Aaron Ziv, A. J. Ziv and Hyman Ziv.

A Shaping Machine Efficiency Test

Some Interesting Experiments to Secure Data on Its Mechanical Efficiency

BY A. LEWIS JENKINS*

The mechanical efficiency of the shaping machine has never been considered seriously important when compared with its velocity diagrams, strength and convenience of operation. Many designs have been developed in striving to attain a velocity diagram having a flat top curve for the cutting stroke in order to have the tool travel at a practically constant speed throughout the cutting stroke. A constant cutting speed tends to increase the life of the tool, permits of a greater number of strokes per minute and also increases the effort of the tool when in the middle of the stroke, thus increasing the capacity of the machine for taking heavy cuts.

The effort of the tool may also be increased by improving the mechanical efficiency of the machine, and the lower the efficiency happens to be the greater are the possibilities in this direction. Upon investigation no data could be found and nothing has been written regarding methods of making such tests. To obtain some data on this subject a machine in the laboratories of the University of Cincinnati was equipped as shown in Fig. 1.

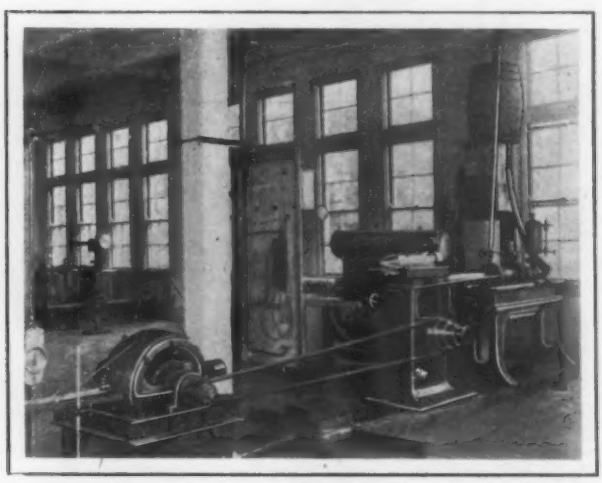


Fig. 1—View in the Laboratory of the University of Cincinnati Showing the General Arrangement of the Apparatus Used

The efficiency was determined by finding the power input and the power output and dividing the former by the latter. The machine tested has been in service for several years; but may be considered as being in fair condition.

Horsepower Input

The power input was determined by the cradle dynamometer shown in Fig. 2, which consists of an adjustable-speed motor of special design mounted upon a structural steel frame. The field frame F of the motor is supported by ball bearings which are concentric with the armature or pulley shaft and is free to rotate with the armature unless a resistance is applied to the arm A. The torque on the armature or pulley shaft reacts on the motor frame F, causing it to tend to rotate. Two methods were used in finding the pull on the arm A, which is supported by the spring balance S, and as the frame F and the arm A tend to rotate to the right, it was necessary to add the weight C. The displacement of the hook on the spring balance is proportional to the load, and the load multiplied by the effective length of the arm A is equal to the torque. The angular displacement of the rod K holding the weight B is also proportional to the torque. The upper end of the arm E, attached to the supporting rod K, is connected to the piston of an ordinary steam engine indicator D, which is fastened to the structural steel frame by having a hole tapped in the top flange of the steel channel to receive the indicator cock. The spring was removed from the indicator and the piston attached to the weight by a wire passing through the indicator cock and a hole drilled in the lower flange of the channel. This weight was used to take up the backlash in the wire connection between the piston rod of the indicator and the arm E, and caused the pencil to faithfully reproduce the motion of the arm E which is proportional to the torque. It was found that the variation in the torque was considerable and the apparatus was so sensitive it was necessary to dampen the vibratory action of the arm with the dashpot G.

The shape of the cards varied considerably, but the one shown in Fig. 3 is characteristic. The line *AB* represents the condition for no load and was gotten by pressing down the arm A, Fig. 2, until it struck the stop H and then pulling the indicator string by hand. The position of H was determined when running the dynamometer with no load. The curve in Fig. 3 shows the path of the pencil when the indicator string was attached to the ram of the shaping machine in a manner similar to that used in attaching it to the cross-head of an engine.

The peculiar shape of the curve is of no importance in computing the power delivered by the motor; some of them being almost straight and some not crossing, depending upon the load, speed and stroke of the machine. The points on the curve can by no means be used in finding the power required at any point in the stroke because the inertia of the heavy motor frame causes the motion of the pencil to lag behind the variations in power, but the area under the curve is proportional to the work put into the machine during the cycle. A heavy frame on the motor would cause the curves for both the forward and return strokes to be almost straight, but the area under the curves would not be changed unless the load were changed.

The lines *DA* and *CB* were drawn perpendicular to *AB* by placing the card on a drawing board, and were not made by the indicator. The area *ADFCB* plus the area *ADECB* divided by twice the length of *AB* gives the average ordinate, and this multiplied by the scale of the spring gives the mean effective pull at the end of the arm A in Fig. 2. It is easily seen that this method gives accurate results when it is considered that the torque on the motor simply produces a difference in tension in the two sides of the belt, whether the belt slips or not, and this difference in tension produces a torque on the driving pulley of the shaping machine, regardless of the amount of slippage there may be between it and the belt.

An indicator having an outside spring was also used, the piston rod of the indicator being attached directly to the arm. This also gave very satisfactory results and did not necessitate the use of a dashpot for dampening the vibrations.

Horsepower Output

The shaping machine ram was loaded by attaching the tool to the plunger of a hydraulic pump as shown in Fig 4. The plunger K was made from a piece of 3-in. heavy pipe with the outside diameter turned down to 3¼ in., and the end working in the cylinder was closed with a plug. A hole was drilled near the other end of the plunger for a pin and the end slotted to allow the tool to press against this pin and be fastened to it by two U-bolts.

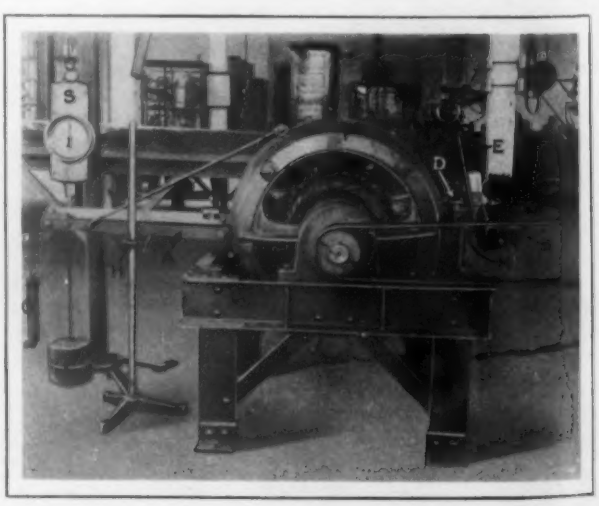


Fig. 2—The Cradle Dynamometer Used

*Associate professor of mechanical engineering, University of Cincinnati, Cincinnati, Ohio.

The pump cylinder consisted of a piece of 4-in. pipe 38 in. long fitted with flangers at each end. To these flanges are bolted two other flanges having the same outside diameter and made to fit a 2½-in. pipe. A hat leather packing is held between the flanges on the end of the cylinder nearest the shaping machine, and, to prevent air from entering the cylinder during the suction stroke, the hole in the outside flange was bored about ½ in. larger in diameter than the plunger. A piece of candle wick was inserted and held in place by a wooden block pressed against a leather sleeve and forming a gland. A small pipe was connected to the cylinder which allowed water to flow down between the stuffing box and leather packing to form a water seal. This was only needed in the preliminary tests in which the desired hight of the suction tank was determined and the shock arresting apparatus on the suction line developed.

The water was discharged through a 2½-in. tee, a 2½-in. check valve and through a 1-in. pipe, to a 14-in. x 5-ft. tank, T. By opening the throttle valve the water in the tank was forced by air pressure into the barrel U, which served as a reservoir and gave sufficient pressure to overcome the friction of the valves and piping on the suction line. The tank was filled with air at any required pressure by running the pump at fairly high speed and allowing air to enter the suction.

The suction pipe is 2½ in. in diameter, provided with a 2½-in. check valve and about as straight and short as could be made. The air chamber V, provided with a gauge glass, allows the operator to observe the pulsations in the suction line. The air chamber did not have sufficient capacity to arrest the pulsations of the suction line when the shaping machine was running at high speeds, and it was found desirable to connect the pipe near the air chamber with the barrel with a piece of fire hose. A hole was bored in the bottom of the barrel for a 2½-in. long nipple which had a coupling on the end inside of the barrel and received the hose on the outside. To stop the flow of water in the suction line and use the pump as a means of getting air into the tank, a piece of 2½-in. pipe was screwed in the coupling on the inside of the barrel, the end of the pipe extending above the top of the barrel.

The reservoir or barrel was elevated to give sufficient head to overcome the friction of the suction line, the exact hight being determined from the indicator card by getting the line for the suction stroke to coincide with the atmospheric pressure line. These cards did not show any variation in pressure on the suction stroke.

The horsepower output was computed from the indicator card by finding the mean effective pressure on the plunger and substituting it in the regular formula.

The shaping machine was carefully set at the desired stroke and the speed of the driving pulley and the position of the throttle valve were adjusted so the pressure in the air tank and the speed would remain constant for several minutes. Cards on the pump and dynamometer were then taken simultaneously and the speed of the driving pulley and the pressure in the tank read. The speed of the shaping machine was determined with an electric counter and a stop watch.

Efficiency

A few results of tests are shown in Table 1. About 500 sets of readings have been made and the efficiency for each set computed. It is the intention of the writer to derive an empirical formula for the efficiency of this machine in terms of the speed length of stroke and pressure on the tool, but as there are four variables involved, it is necessary to take the data systematically and plot

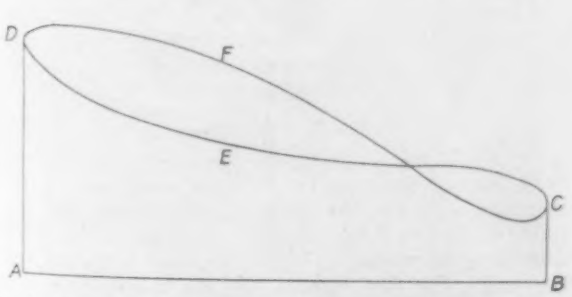


Fig. 3—A Characteristic Indicator Card from the Shaping Machine

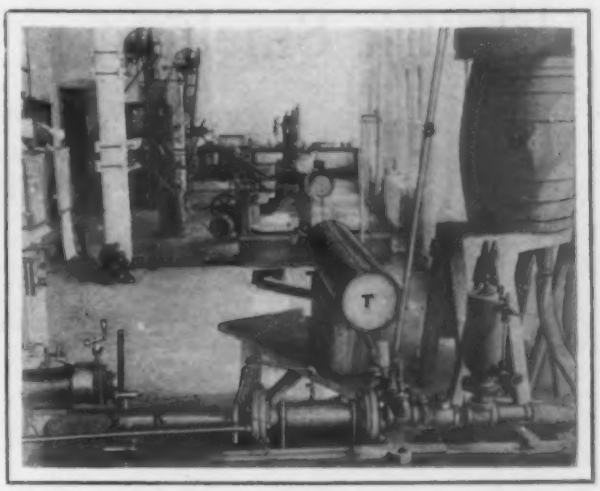


Fig. 4—The Arrangement of the Shaping Machine Ram, Pump, Tank, Etc.

curves between two variables at a time by having the other two constant in order to find the effect of each variable separately. Such a formula would be of no particular value because it would only be true for this machine.

Table 1—Results of Efficiency Tests on 16-Inch Shaper

Length of stroke, in.	Load on tool, lb.	Strokes of ram per min.	Efficiency, per cent.
2	415	44.4	26
2	830	14.8	36
2	1037	22.2	40
4	297	37.0	35
4	415	22.2	38
4	622	44.4	40
6	1037	37.0	51
6	622	14.8	48
6	207	29.6	28
8	207	44.4	27
8	830	22.2	46
8	1037	22.2	52
10	415	14.8	54
10	622	44.4	49
10	1037	22.2	50
12	207	37.0	26
12	415	14.8	46
12	622	44.4	46
14	830	14.8	52
14	1037	26.9	41
14	415	22.2	38
16	207	26.9	30
16	622	26.9	53
16	830	22.2	52

To the writer's knowledge this is the most extensive test ever conducted on a shaping machine and although there are a few objections to the method in that it does not faithfully represent the actual working conditions by not reproducing the side and vertical pressure on the tool, it will at least give results that would undoubtedly compare favorably with results obtained by a more accurate method. The method used has been criticised on account of the inertia of the pump plunger. Another objection is that the load acts on the tool throughout the complete stroke. This method does, however, offer a satisfactory means of comparing different makes or types of machines. It would be interesting to compare the results of tests conducted in this manner on geared and crank shaping machines of the same size. It also offers a means of comparing the efficiencies of the various mechanisms devised to give an almost ideal velocity diagram.

Mechanical Engineers' Gift to German Museum

The German National Museum in Munich received last week from the members of the American Society of Mechanical Engineers, who have been touring Germany, a massive relief of the Panama Canal as a token of appreciation of the hospitality the engineers enjoyed in the Fatherland. The museum authorities asked the visitors to accept a telescope manufactured by the famous German optician Fraunhofer as a return gift for their headquarters in New York City.

The W. S. Tyler Company, Cleveland, Ohio, will shortly place contracts for the erection of a four-story brick and steel building, 55 x 144 ft., which will be used for office purposes.

Electric Smelting of Iron Ore in California

Steps by Which the Noble Electric Steel Company Developed Its Furnace and Practice for the Making of Foundry Iron

An account of the progress made at the plant of the Noble Electric Steel Company, the first American plant for the electric reduction of iron ore, is given by the manager, John Crawford, in the July issue of Metallurgical and Chemical Engineering. A liberal abstract follows:

The plant of the Noble Electric Steel Company is situated on the banks of the Pitt River at Heroult, Shasta County, California, a station on the Sacramento Valley & Eastern Railroad, which branches off the Southern Pacific Railroad at a station called Pitt, lying about six miles to the west of Heroult. It consists of one 2000-kw and one 3000-kw iron furnace of the long and narrow type, one 2000-kw iron furnace of the shaft type (not now operated), one 2000-kw steel furnace of the tilting type (not now in operation), 20 charcoal retorts of the horizontal type of 2¼-cord capacity, a refinery to handle the by-products of the wood distillation, and four 5-ton unit lime kilns of the continuous type. Beside these there is a power substation and the necessary machine shops, office, residence and furnace buildings, etc.

Conditions to Be Met

To build an electric furnace for making pig iron which can be operated as a technical success is quite an achievement, but this having been accomplished, there still remains the very considerable problem of making it an economic success. With approximately the same costs for power, charcoal, and stock, local conditions caused the abandonment of the type of furnace which in Sweden is operating commercially.

The principal users of pig iron on the Pacific Slope and Far Western states are custom foundries. Specialty foundries, such as those making stoves, bath tubs, pipe, etc., are still relatively few, as are also open-hearth steel furnaces; so that to operate electric furnaces successfully on the Pacific Coast, grades of iron must be produced which meet the demands of general foundry purposes. There is on the coast an abundance of scrap cast iron, and foundries making what are spoken of in the East as heavy castings are few in number; hence the popular demand is for a soft high-silicon iron which is a good scrap carrier and can be easily machined when in light castings.

Thus the problem became one not merely of making pig iron successfully but of making iron with a silicon content of from 2 to 3 per cent. economically. When a blast furnace works "off," it ordinarily means only a slight concession in price to get rid of the low-grade iron, while at Heroult if iron runs under 1 per cent. silicon it means a large concession in price to dispose of it. As electric furnaces, like blast furnaces, misbehave at times it was necessary to have a furnace which would respond readily to alterations in the burden and still be of large enough capacity to be efficient.

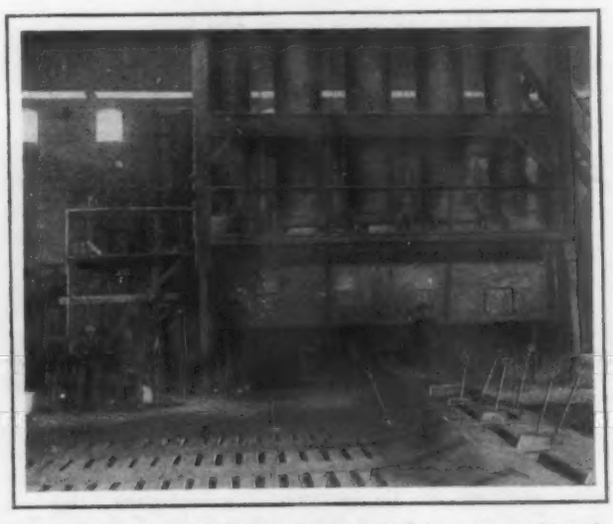


Fig. 1—Electric Furnace No. 6 for Reducing Iron Ore at Heroult, Cal., Showing Pig Bed

Historical

For some 25 years one of the stockholders of the company has controlled a deposit of magnetite of considerable extent which is exceptionally high grade and runs very low in sulphur and phosphorus. The following analysis represents the average of several scarfs taken across a quarry face 70 ft. wide and 45 ft. high. The quarry face has now been extended to a width of 115 ft. and is still in ore:

	Per cent.
SiO_2	3.43
Al_2O_3	0.81
CaO	0.70
MgO	0.32
MnO	0.28
CuO	Trace
Fe_3O_4	79.63
Fe_2O_3	14.56
	99.73
Fe	67.86
P	0.0116
S	0.021

In 1906 these properties were brought to the attention of H. H. Noble, president of the Northern California Power Company, who, after some correspondence with Dr. Paul L. T. Héroult, built in 1907, a 1500-kw furnace of the three-phase resistance type. Pig iron was produced in this furnace, but mechanically it was weak.

In May, 1908, there was designed by E. E. Cox and others under the management of D. A. Lyon, a furnace of the shaft type embodying the principle of a shaft terminating at its base in a bosh which was super-imposed on an arched crucible through which the electrodes penetrated at an angle. This furnace, which was put in operation in the summer of 1909, by a singular coincidence is almost identical with the furnace built at Trollhätten, Sweden, about the same time. From the style of its construction, it could not be made to respond readily to changes in the burden, and in order to make consistently high-grade foundry iron this is an essential. In a blast furnace, too great an excess of coke in the burden can be taken care of by increasing the quantity of air blown in, but in an electric furnace this is not feasible, as the oxygen would attack the electrodes. The excess of carbon must be taken care of by an excess of oxygen put into the furnace through increasing the ore in the burden. This must be done, it is pointed out, by gradual additions and to get the desired result sometimes takes several days. Thus, while the shaft type of furnace promises economic success if operated on low-silicon, low-carbon white iron, known in Sweden by a term equivalent to "pig steel," it had to be abandoned for the making of foundry iron.

Following this, an attempt was made under the direction of S. T. Wellman to work out the theory of reducing the ore with the proper charcoal and flux to sponge iron in a series of small, portable electric furnaces which were then picked up one at a time by a mechanical charging machine like those used in charging open-hearth steel furnaces and their contents emptied into an electric smelting furnace similar in design to the arc-type of tilting steel furnaces. Mechanical difficulties and inability to control the metallurgy of the process caused it to be abandoned after a very brief period of operation.

The Present Furnaces

R. E. Frickey and others, after considering the causes of failure of the previous furnaces, designed a 2000-kw three-phase furnace of the long and narrow type, having four electrodes delta-connected and suspended between five charging stacks. This is the type of furnace now operated. The first furnace was put in operation in November, 1911, and has been working since, except for

periods when operations were suspended to effect advantageous mechanical and electrical changes. All was not smooth sailing, of course, but the furnace promised economic success and a companion furnace of 3000-kw capacity was built.

This type of furnace consists of a rectangular steel shell, 28 ft. long and 10 ft. wide, lined with standard furnace brick. The lower part of the furnace is battered four ways and corresponds to the blast furnace crucible, while the upper part of the furnace corresponds to the bosh or smelting zone of the blast furnace. The furnace is surmounted by five charging stacks, 18 ft. high, which are battered so as to prevent the descending burden from hanging up. Between the stacks the top of the furnace is arched over and through the center of these arches the electrodes penetrate vertically into the charge. The electrodes used are of Acheson graphite, 12 in. in diameter, and are connected with a tapered male and female joint.

No arrangements have been made on these furnaces to utilize the furnace gases, as the way in which to utilize them best had to be studied rather as an economic than a metallurgical problem; that is, whether the saving in charcoal effected by circulating the gases back through the furnace and taking advantage of the reducing action of the CO is greater than the saving in fuel by burning them under lime kilns, charcoal retorts, or elsewhere. The company's observations have led it to adopt the latter course.

Electrical Arrangements

Power is supplied by the Northern California Power Company three-phase at 60,000 volts into the work's substation. Here are six Westinghouse 1500-kw oil-immersed and water-cooled lowering transformers wound for a voltage ratio of 38,100 to 2200 volts, Y-connected on the high-tension side. The high-tension leads pass through a General Electric oil switch by which the furnace load is cut in or out.

The three 750-kilovolt-ampere furnace service transformers, set close up to the rear side of the furnace, furnish three-phase currents at from 40 to 80 volts. They are specially designed General Electric transformers, oil-immersed and water-cooled and capable of standing an overload of 25 per cent. On the 2200-volt primary side are brought out eight current taps for voltage regulation. These are taken to an oil-immersed individual solenoid-operated contactor panel which is connected with the switchboard to give fifteen steps for voltage regulation.

The connections from each of the transformers to the electrodes on the low-tension side consists of eight pieces of ⅜-in. by 8-in. copper bus-bar connected in delta from the three transformers to the four electrodes.

The electrode holders are water-cooled cylindrical stuffing boxes made of 98 per cent. copper. The electrodes are suspended in these from above and the annular space between the electrode and the holder is packed with a specially prepared graphite capable of being compressed to a density equal to that of the electrode itself. This packing material offers no more resistance to the passage of the current than the electrode and because of its unctuous nature permits the electrode to be raised and lowered without breaking electrical contact.

Fig. 2—Furnaces Nos. 6 and 7

Electric control is through a switchboard on which are mounted, in rows of three, a separate set of meters for each phase. A set consists of a Thompson ammeter, a Thompson voltmeter, a Thompson wattmeter, and a Weston power-factor meter. Beneath the last named are three hand wheels to control the voltage variation and below these are three knife switches to control the load on the board. A separate recording wattmeter for each phase is also set on this board.

For operating the voltage control and the circuit breaker, there is a 7½-kw motor-generator set comprising

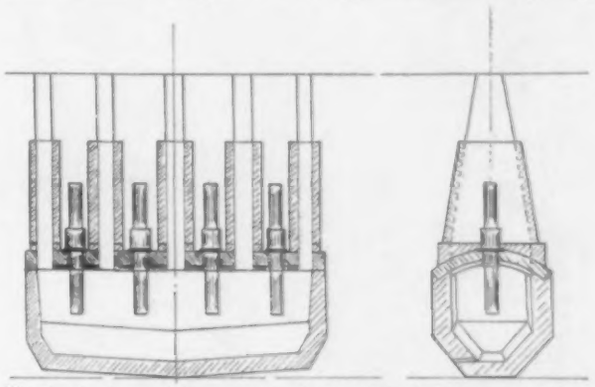


Fig. 3—Sections of Furnace No. 7, Showing Arrangement of Electrodes and Charging Stacks

a 125-volt direct-current generator, direct connected to a 10-hp induction motor. Above these on a panel are mounted a circuit-breaker, an ammeter, voltmeter, and the necessary switches.

From an electrical standpoint, this type of furnace has worked far more smoothly than any with which the author is familiar. When everything is normal inside of the furnace the instruments will show little variation throughout the 24 hours, except that the power-factors which average respectively 90, 85 and 70 per cent., improve a few points after the furnace is tapped and gradually fall off again as the molten iron accumulates in the bottom of the crucible.

Operation

The stock is charged into the five charging stacks on the basis of 500-lb. units of iron ore. This small charging unit, while it entails extra labor on the feed floor, has the advantage of mixing the ore, charcoal and flux as intimately as if the charge were bedded, and homogeneity of charge is very essential.

There has been some experiment with the possibility of utilizing coke or gas carbon instead of charcoal. But the 72-hour metallurgical coke tried offers two objections: First, its electrical conductivity is so good that much of the current passes between the electrodes in the upper part of the furnace. The smelting zone is thereby raised and the furnace runs hot on top with attendant melting of the arches and cold at the bottom. Second: This coke, because of its density and high crushing strain does not break down like charcoal as the burden descends; hence, less surfaces of carbon are exposed to be oxidized by the ore and there is a less intimate mixture of the two. Reduction of the ore takes place more slowly, the silicon in the iron is lowered, the power consumption per ton increases, and thus the efficiency of the furnace is reduced. However, with certain precautions in crushing the stock and feeding it, a mixture of 60 per cent. coke and 40 per cent. charcoal has given a fair degree of furnace efficiency and the grade of the iron was kept up to No. 2 foundry.

At present successful operation of electric iron furnaces depends among other things on an abundant and fairly cheap supply of charcoal. This generally limits their field of activity to well-timbered regions which are usually isolated and where freight rates are high. The author believes many coals which make a very poor metallurgical coke for blast furnace use on account of their low crushing strain, might make a satisfactory fuel for electric furnace use.

The fact that the ore is of so high a grade renders the metallurgical problem somewhat different from that usually encountered. The ore as it comes from the quarry will often run for weeks at a time as low as 2½ per cent. SiO_2 and from 67 to 68 per cent. Fe; so that to make pig

iron which will run from 2 to 3 per cent. Si, it is necessary to augment the silica in the ore by the addition of barren quartz. The requisite amount of lime or limestone is added so as to give theoretically a slag running about 47 per cent. SiO_2.

In calculating the charcoal for the burden it is assumed that all the carbon burns to CO, as it is necessary any way to carry an excess of charcoal in order to make high silicon iron. Thus to make 2.75 silicon iron the theoretical quantity of charcoal (containing 85 per cent. fixed carbon) necessary is 35 per cent. of the pig, whereas there is actually used about 40 per cent. Inasmuch as any necessary change in the burden is distributed over five stacks the furnace responds very rapidly and practically permits control of the silicon in the iron within a limit of 0.5 per cent.

The iron is tapped three times a day into sand pig-beds. A sample is taken from each bed from a pig 10 inches long cast for the purpose. The drillings from the several beds are ground together for analysis. The sow and pigs are lifted from the beds by a traveling crane with grab-hooks and broken by a drop used in connection with an electric magnet.

The system of grading is somewhat like that used in grading Southern iron, except that it is entirely by silicon content as the sulphur and phosphorus run uniformly under 0.04 per cent. when operating on charcoal alone.

The system adopted by the American Foundrymen's Association for sampling carload lots is followed and the company sells if necessary on a guaranteed silicon content within 0.25 per cent. limits.

Analyses of lots shipped to various foundries and sold on a guaranteed silicon content and a maximum of 0.04 per cent. sulphur and phosphorus were as follows:

	No. 1, per cent.	No. 2, per cent.	No. 3, per cent.
Silicon	2.88	2.42	1.78
Combined carbon	0.09	0.27	0.60
Graphitic carbon	3.38	2.94	2.86
Sulphur	0.028	0.036	0.028
Phosphorus	0.031	0.023	0.030

Pig iron No. 1 was made on a guaranteed silicon content of 2.75 to 3.00 per cent.; No. 2 on a guaranteed silicon content of 2.25 to 2.50 per cent. and No. 3 was sold on a guarantee of from 1.75 to 2.00 per cent. silicon and 0.04 per cent. maximum phosphorus.

Furnace Efficiency—The Author's Conclusions

The efficiency of this type of furnace increases in slightly more than direct ratio to the increase in load, and it is of interest to note that as in the case of the electric steel furnaces the faster the furnace is operated the cooler the walls and roof are, and the smoother it works generally. In explanation is the theory that the faster smelting takes place the faster the cool charge can descend to protect the arches and walls.

In technical efficiency, the long and narrow type of furnace is pronounced not the equal of the shaft type carrying the same load, though at Heroult power consumption has been as low as 2200 kw-hours per ton of pig when carrying a load of 3000 kw., but the long and narrow type offers a possibility of building several furnace units on each other like copper blast furnaces. By this means the radiation losses and electrical losses will be cut down and the efficiency of what are in single-unit furnaces the end-electrodes will be greatly increased.

A bank of three or four units arranged in this way will admit of as simple metallurgical control as a single-unit and will have an efficiency, the author believes, equal to a shaft type of furnace carrying the same load. Further, it can be arranged so that part of the furnace can be frozen up and repaired while the remainder is operating, and for this reason its yearly output should exceed that of the shaft type.

From the nature of its construction it is capable of being made more nearly fool-proof metallurgically, mechanically, and electrically than the shaft type, and further the electrode consumption is lower, due to the fact that the electrodes penetrate vertically into the charge.

The author says in conclusion: "While I hardly agree with the prophecies made by some that electric furnaces for producing pig iron will eventually be competitors of blast furnaces even in the regions where economic conditions make the latter possible, I do feel that where electric power can be obtained cheaply and where coke and freight rates are high and for making superior grades of iron, electric reduction furnaces will enable many large bodies of iron ore to be worked which would otherwise remain idle and that the electric iron furnace, both of the shaft type and of the long and narrow type, each in the field best adapted for it, will make steady progress."

Electric Pig Iron Production in Sweden

Late Data on Results at Hagfors—Adapting the Iron to the Steel-Making Process

In a paper read recently before the Värmland Mining Association in Sweden, E. Fornander gives some interesting late information concerning electric pig iron production at Hagfors, Sweden. Three electric furnaces producing pig iron were built there in 1911 to 1913, the last one not yet in operation. They are all of the Electrometal type, each having a capacity of 3000 h.p. Current is obtained from the power station of the Uddeholms Aktiebolag, Forshut, about eight miles away and is transmitted at 12,000 volts. These furnaces differ from those at Trollhättan in the use of larger electrodes and of six instead of four. They are cylindrical, with the new screw thread arrangement, insuring a saving of electrodes. Three different grades of pig iron have thus far been produced: open-hearth, puddling, and Bessemer. The analyses are reported as follows:

	Open hearth, per cent.	Puddling, per cent.	Bessemer, per cent.
Silicon	0.40 to 0.60	0.20 to 0.30	1.00 to 1.40
Manganese	0.30 to 0.50	0.20 to 0.30	2.50 to 3.00
Phosphorus	0.011 to 0.018	0.011 to 0.018	0.015 to 0.019
Sulphur	0.015	0.015 to 0.020	Traces to 0.005

The pig iron for the open-hearth furnace has been made purposely semi-white, though there are said to be many reasons in favor of making a perfectly white pig. Charges have been altered to attain this but thus far without much success. At first the sulphur content caused some trouble, it being inclined very often to exceed the above figures. This is now prevented by increasing the basicity of the slag by adding lime and it is likely that the sulphur could be further reduced if more lime were added. No particular advantage could be gained, however. It is pointed out here that the reduction of the content of sulphur is dependent, not only on the temperature and the basicity of the slag, but that the proportion of MgO to CaO is also of great importance. Attempts to make a puddling iron of higher silicon content were not at all satisfactory. Steel made from the Bessemer pig iron has been very satisfactory. The first trials were a failure, due to a too small percentage of silicon and manganese in the pig iron used. It was thought that these two elements need not be higher in electric pig iron than usually, but this is not the case due chiefly to the temperature of the electric Bessemer pig iron being lower than that of the ordinary Bessemer iron. Some figures relating to the workings of the process at Hagfors are as follows:

	Open-hearth pig iron	Bessemer pig iron
Production in 1912, tons	6,707	1,088
Normal load, per furnace, kw	2,200 to 2,500	1,900 to 2,200
Average production per week, tons	140 to 160	110 to 130
Maximum production per week, tons	164	....
Consumption of energy, kw per ton	2,200 to 2,500	2,600 to 3,000
Consumption of charcoal, hectoliters	20 to 21	20 to 21
Percentage of pig iron from ore	58 to 60	57 to 59

The results obtained for the two qualities vary somewhat. The cost will, on the whole, be the lowest for perfectly white iron, for the reasons that the load can generally be kept higher without injuring the furnace arch, that the consumption of electric energy will be lower, that a higher production will result from these conditions, and finally that the cost of repairs will be less. The consumption of electrodes has been high, varying from 6 to 9 kilos per ton, which is more than the corresponding figures at Trollhättan. This is due to a large consumption of energy, to an active circulation and a higher percentage of CO_2 and to a reduced load per unit of area of the electrodes. The gas from the furnace is employed as a fuel in the open-hearth furnaces with satisfactory results. An estimate puts its value as fuel at 56c. to 85c. per ton of steel.

It is stated that if there has been any effect on the steel from the use of electric pig iron, it has been in the direction of improvement.

Modernizing an Old Manufacturing Plant

Details of Changes at E. Horton & Sons Company's Works—Ingenious Home-Made Facilities for Storing and Handling Work

The shops of the E. Horton & Sons Company, Windsor Locks, Conn., offer a striking example of rejuvenation of an old plant into one which is essentially modern in every working detail that tends toward economical production. The company manufactures a wide range of sizes of chucks. The present management in taking hold of the business a year ago had to master the problem not only of modernizing the premises, the equipment and manufacturing methods, but also of consolidating into the business that of others making similar lines, namely, the S. E. Horton Company, Windsor Locks, and the Morrow Mfg. Company, Elmira, N. Y. The latter made ball bearing drill chucks.

An addition to the building, together with a somewhat radical readjustment of the interior arrangement, gave additional manufacturing space. Old equipment has been replaced by new, the grouping of machinery has been carried out on a scientific basis, and improved facilities for handling work have been introduced. The result is a large increase in capacity and a much greater increase in production.

The plant was chosen for the future home of the combined business because it could be given ample size and the natural location is excellent, and particularly because the company owns a 999-year lease of water-power from the Windsor Locks canal, which assures ample mechanical energy for present as well as future needs.

The renovated works contain various striking instances of the aggressive independence which is oftentimes characteristic of manufacturing houses located in communities where they must depend upon their own resources unless they would go out of town to have work done. The home made traveling hand crane, the stock racks for heavy steel, a staircase and the stockroom are all samples of this, as will be seen in the illustrations.

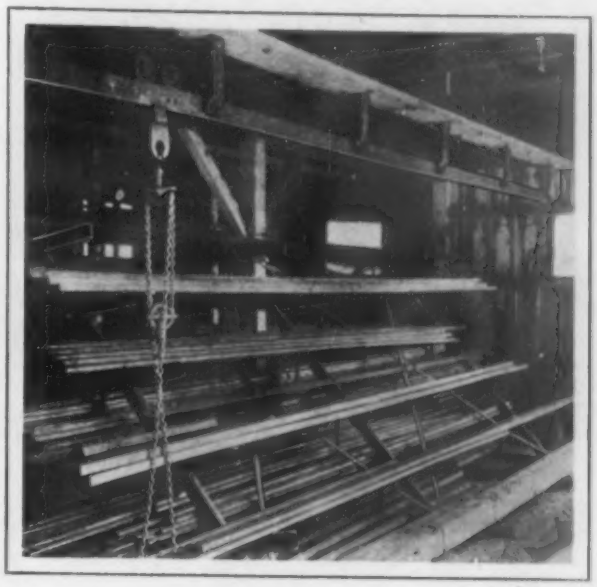


Fig. 2—The Stock Rack

The building has three stories, the lower of which is a basement at the front, but with full exterior wall hight

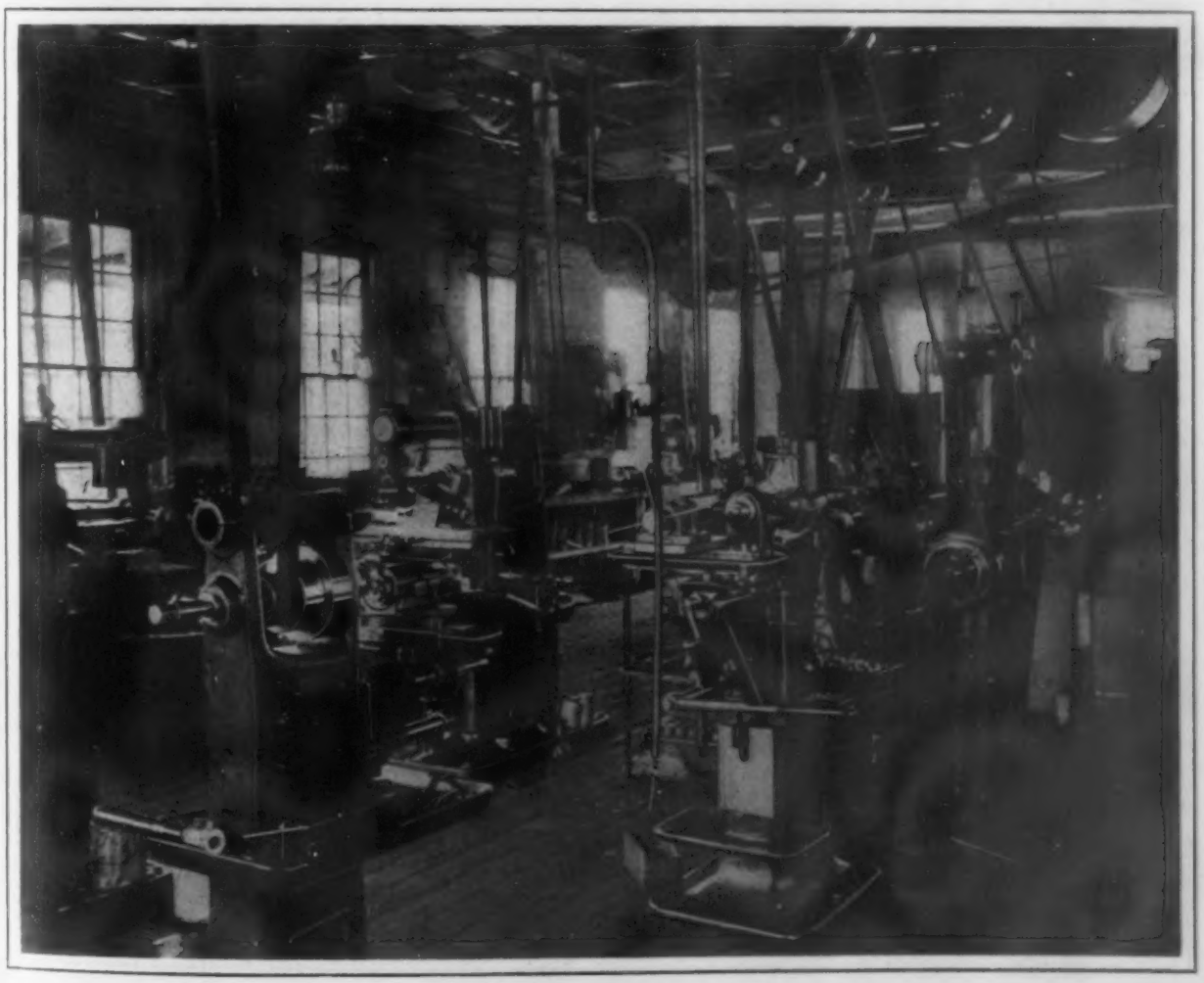


Fig. 1—The Morrow Chuck Department

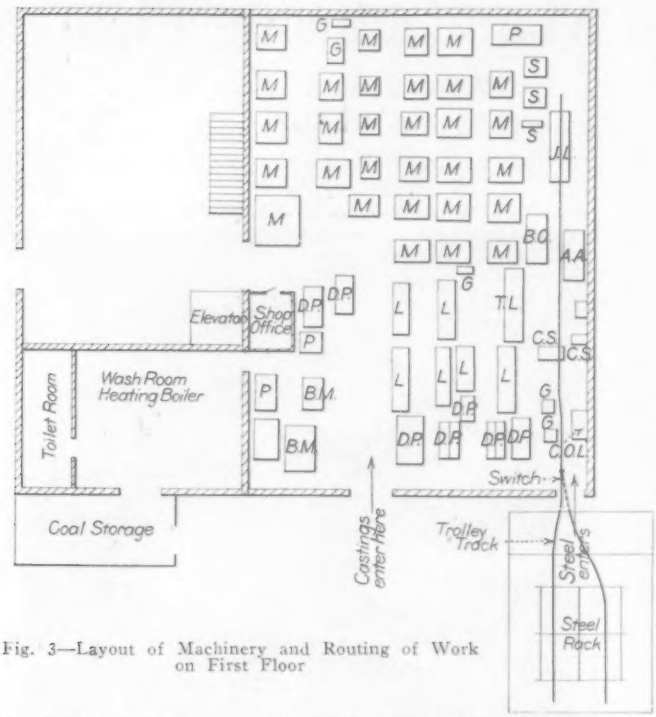


Fig. 3—Layout of Machinery and Routing of Work on First Floor

M. Milling Machines—L. Lathes—B.M. Boring Mills—D.P. Upright Drilling Machines—C.S. Circular Cold Sawing Machines—S. High Speed Band and Hack Sawing Machines—G. Tool, Twist Drill and Saw Grinding Machines—C.O.L. 3-in. Cutting-off Lathe—T.L. Large Turret Lathe. P. Heavy Power Press.—A.A., B.O. and J.L. Automatic and Hand Screw Machines

at the rear. All heavy machine work is done on this floor, the machined parts being sent by elevator to the floors above. The chuck bodies and the lathe chuck jaws are practically completed before going upstairs, a general view showing the chuck bodies in course of manufacture being given in Fig. 4. The screws, gears and smallest jaws are entirely blanked out on the lower floor, the finishing operations being completed on the upper floor, where all assembling is done. A portion of the chuck assembling department is shown in Fig. 6. A useful characteristic of the works is that the entrance for material is at grade at the rear of the shops, while the shipping platform and office entrance are also at grade, at the front of the floor above. The third story is devoted to a distinct shop, which is illustrated in Fig. 1, for the manufacture of the Morrow drill chuck. At one side of the machine shops is the foundry, which is specially equipped for chuck work, and at the other side is the blacksmith and forging shop.

The vital feature of the production, however, is the systematized layout of the machinery departments, with a maximum of efficient compactness, making superintendence easy and without lost motion. The arrangement of the machinery and the course of both bar stock and castings through the departments, for the roughing operations and the heavier tasks, are shown in Figs. 3 and 5. The steel is brought in from the stock rack by an overhead hand crane, and the heavy flat bars are cut up on circular cold saws, while the round stock goes to the various automatic and hand screw machines and the cutting-off lathes. The jaw blanks next pass through the milling machine department to the elevator, to be distributed to the machines on the floor above.

The castings enter the building near the lathe and boring mill department, and after being turned and receiving the required boring and drilling operations on machines located close by, they pass through the milling machine group to receive the various operations of machining the jaw slots. When the work is completed they also are close to the elevator.

The lighter gear and thread cutting is done at the farther end of the assembling floor, so that these parts meet the heavier pieces at the assembling end of the second floor. The tool department is at the end of this room, near the superintendent's office. The shop tools are all kept in a screened-in storage room, in direct charge of the tool department.

The value of an accurate and thorough system of storage of parts cannot be overestimated in a business where quick deliveries of product are required, with slightly varying combination of product. For instance, chucks are ordered with different shapes of jaws, the body and op-

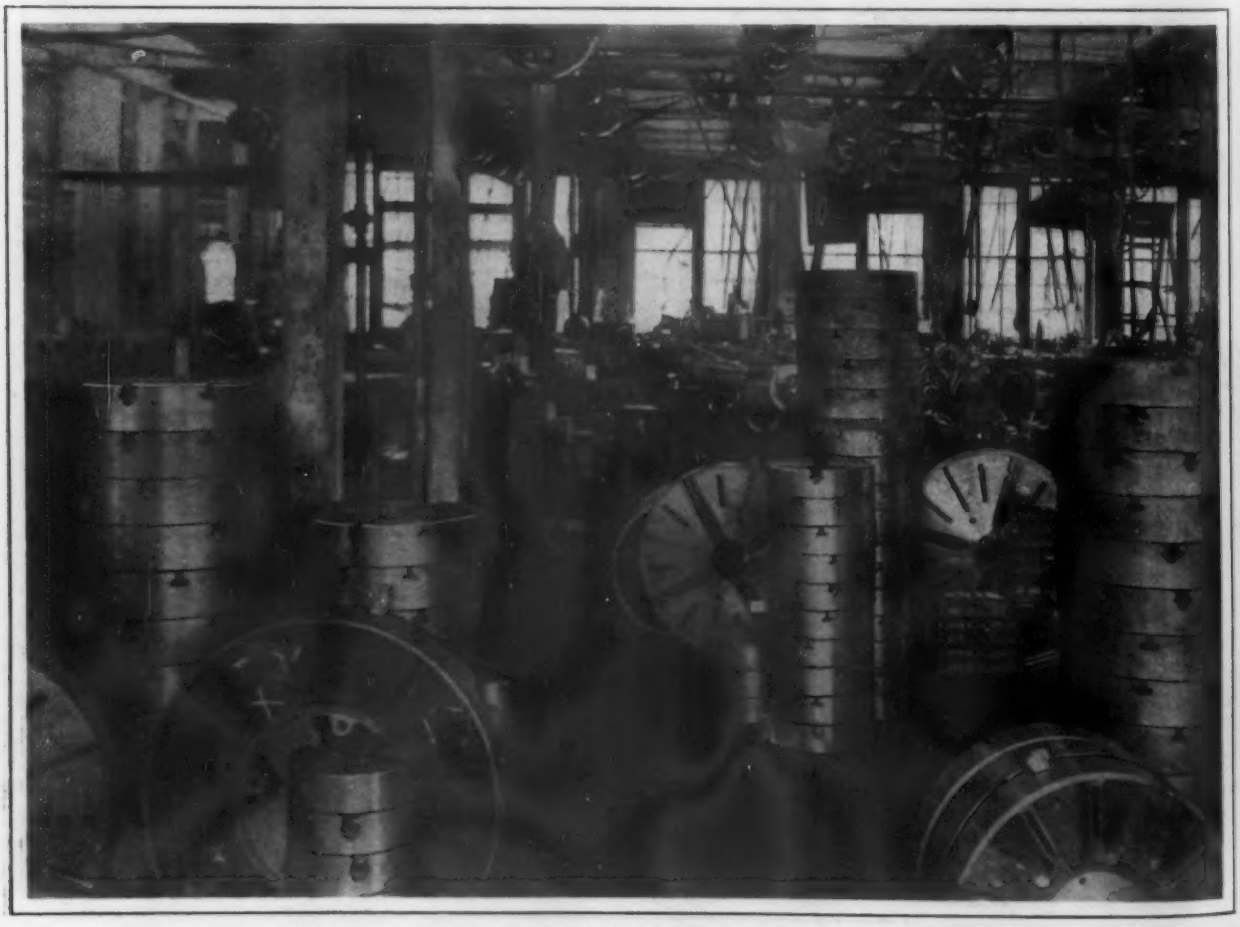


Fig. 4—General View Showing the Chuck Bodies in Course of Manufacture

erating parts being standard. By carrying all the parts in stock, the assembling of unusual combinations can be promptly accomplished. With steel chucks and others of the large and heavy types, a given amount carried ready for assembling as called for makes a much more satisfactory stock than if the same chucks were assembled and boxed.

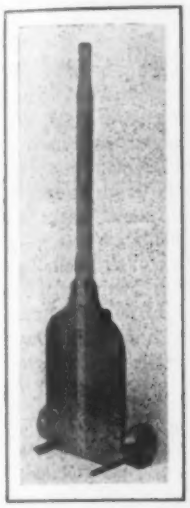


Fig. 9—A Special Truck Designed for Carrying the Heavy Chuck Bodies

The stockroom is another striking example of the ingenuity already mentioned which has been directed toward economically produced conveniences. The partitions consist of a framework of angle iron covered with poultry netting. The angles are bolted together, and the netting is fastened to them by steel strips which are also held in position by bolts. A wooden strip across the door carries the lock. The construction is wholly substantial, and admirably answers the purpose of keeping out intruders. The shelves for this department were purchased and carry wooden boxes which contain the several parts.

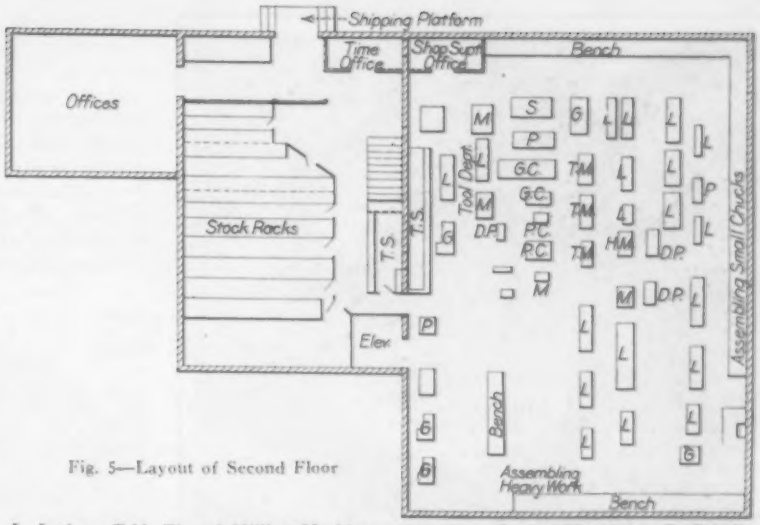


Fig. 5—Layout of Second Floor

L. Lathes—T.M. Thread Milling Machines—G.C. Gear Cutting Machines—G. Grinding Machines—M. Universal Milling Machines—H.M. Hand Milling Machines—D.P. Upright Drilling Machines—P. Planing Machine—S. Shaping Machine—T.S. Tool Storage

The steel storage is an example of the ingenuity exercised in the renovation of the shops. The racks, which are shown in Fig. 2, are located in a shed just outside the rear entrance to the ground floor. In appearance they resemble the skeleton of a pitch roof. The stringers consist of channel bars, and the crossbars are of the same material. They extend beyond the sides of the inverted V, and are bent upward at the ends. Consequently, there is rack space both within and without the V. Angle-iron uprights serve to subdivide the rack space for convenience in storing different classes and sizes of steel. The rack is held together by rivets, and has the great strength required in carrying so heavy a load, and at the same time is easy of access. The rack is served by a hand crane operating on an overhead trolley, which is also home made. The tracks, one over each side of the rack, come together at the shop door where a switch is placed, operated by rolls running on a short cross-rail, as illustrated in Fig. 7. The trolley carries the bars to the cutting up tools.

In handling work about the shop, special trucks, built by the Geo. P. Clark Company, a neighbor, of Windsor Locks, are of great importance. The custom had been to roll the heavy chuck bodies, some of which weigh 600 lb., along the floor to the desired location. In addition to the expenditure of labor, the element of danger was always present, for the unwieldy flat cylinders might get away from the laborer. The truck designed for the purpose is illustrated in Fig. 9. It has a wooden platform which is in the same

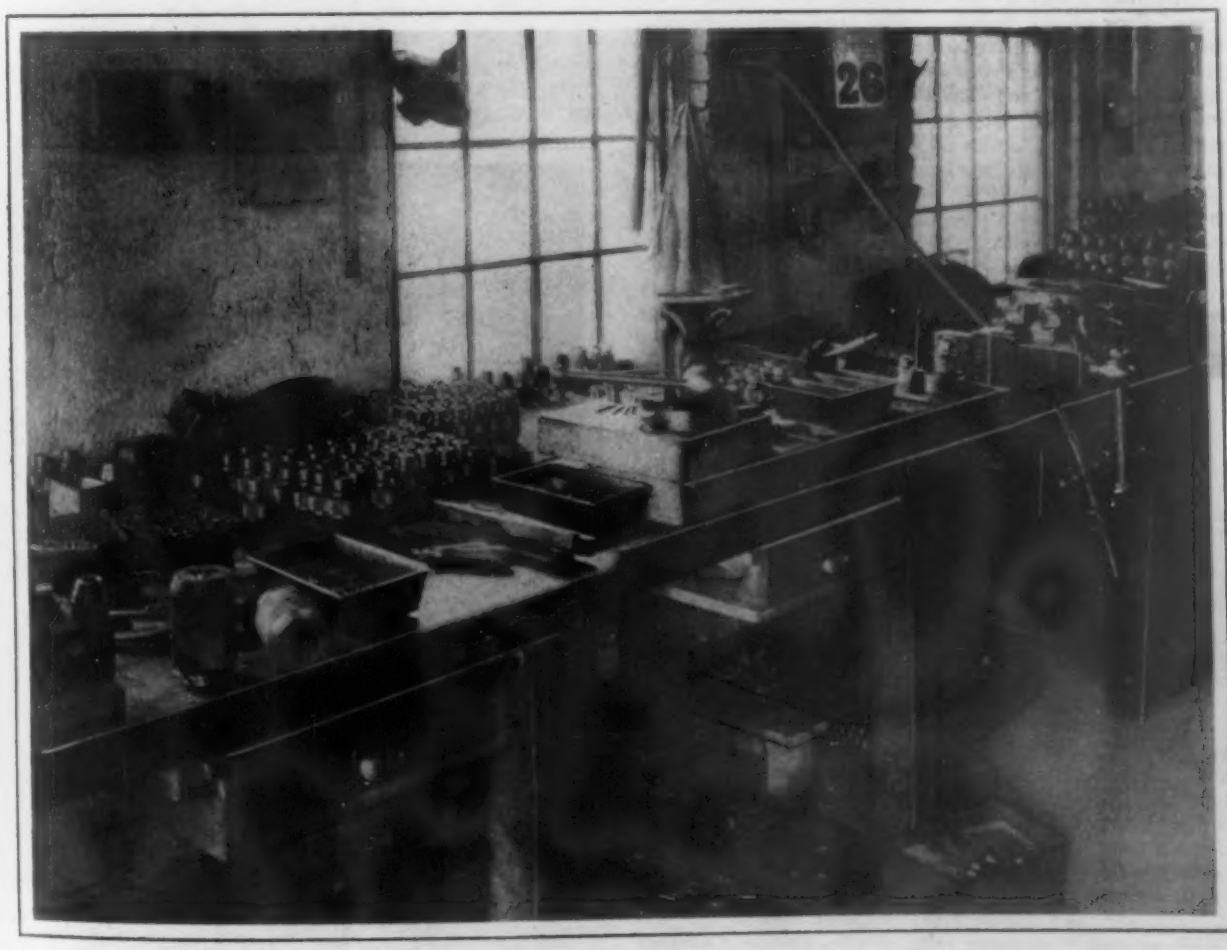


Fig. 6—Assembling the Chuck

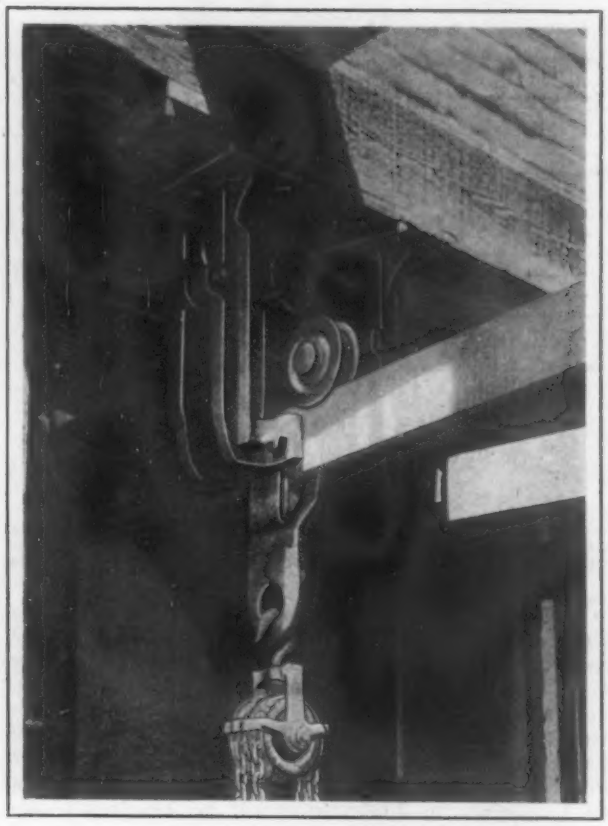


Fig. 7—The Home Made Trolley Switch

plane with the handle, and is provided at the lower end with two toes that slip beneath the arc of the casting at either side of the center. The flat back of the body rests securely on the platform. The leverage of the handle makes it an easy matter to push the heavy weights about the works. A sectional shelf truck is a great convenience in handling parts.

The shop offices are partitioned off at the front of the second floor of the building. The windowed walls place the superintendent in close touch with the men of the department, in that each is in full view of the other. In fact, the manager also spends much time there, finding it a pleasant and convenient place in which to plan out details of shop work and of design of products. Thus the officers and the workmen are working side by side, as it were.

The immediate need of new stairs from the ground to the second floor, combined with the prospect of delay in getting the work done by specialists, led the company to undertake the task of constructing them. The stringers are heavy channels as can be noticed from Fig. 8, the lower ends of which are imbedded in the cement floor. The treads, cast in the company's foundry, are bolted to the beams at either end. The hand rail is a heavy iron pipe. The work was accomplished quickly and at a moderate expense.

A Dodge Branch at Indianapolis

The Dodge Mfg. Company, Mishawaka, Ind., has opened a sales office at 1512 Merchants' Bank Building, Indianapolis, the agency connection with the Vonnegut Machinery Company having been severed. Edwin M. Carver has been placed in charge of the new office, and with a staff of assistants is now covering the field formerly taken care of by the Vonnegut Company. He goes from the general offices at Mishawaka, where he has been connected for some years with the engineering and sales departments. He is a graduate of Purdue University, and until the last year or two gave most of his time to experimental work and important tests covering improvements in Dodge goods. His last work as an engineering expert was in connection with a test on rope drive efficiency, one of the most exhaustive ever carried through. The results of this test were so highly satisfactory that they were reported to the American Society of Mechanical Engineers by E. H. A'Hara, general superintendent of the company.

There has been some talk of the Dodge Company building a large branch house in Indianapolis, but for the present at least it will not be undertaken. This company manufactures power transmission machinery, elevating and conveying equipment, water softeners and purifiers, and bearing metal. The opening of an office in Indianapolis means that the company will take a more lively interest in affairs in that locality. It now has branches at New York, Boston, Philadelphia, Pittsburgh, Cincinnati, Indianapolis, Chicago, Minneapolis, Portland, Ore., St. Louis and Atlanta, Ga. Almost 2000 people are given employment at Mishawaka and the different branches.

Crocker Brothers, Forty-second street and Madison avenue, New York, announce that they are again exclusive sales agents in all territories for the Tuscaloosa foundry pig iron made by the Central Iron & Coal Company at Holt, Ala. While standard Southern iron is deficient in manganese, the Tuscaloosa iron can in special cases be supplied with one per cent. or higher of manganese. To handle sales of Tuscaloosa iron in the West, the firm has opened an office in the First National Bank Building, Cincinnati, Ohio, which will be in charge of H. F. Topp and W. C. Holzworth. Mr. Topp was formerly with the Dayton Coal & Iron Company, and is well known to the foundry trade through the Central West.

Theodore Geissmann & Co., Inc., Commercial National Bank Building, Chicago, have been appointed district sales agents for the Alton Steel Company, Alton, Ill., for the distribution of its output of hoops and bands. The company's plant will have a capacity of 75,000 tons annually of basic and acid open-hearth steel and will be in operation in September of this year.

E. Cooper Wills & Co., Frederick, Md., have just installed a steel plant for the Morris Iron & Steel Company, also of Frederick, which is expected to be turning out steel for castings within a week or two. The furnace supplied is the latest design of the firm's furnace and is known as the Wills combination steel furnace.

An imperial decree has just been signed establishing gun works in Zarizin, Russia, financed by Russian bankers in co-operation with Vickers, Ltd., London. The capital is to be £1,500,000. Building of the new works has already begun. The company has important orders for large and small guns.

Fig. 8—The Home Made Staircase

Eliminating the Dull Season

The manufacturer who does a rushing business for part of the year, then reefs his sails, lays off part of his force and patiently awaits the arrival of what he calls his season, is not alive to his opportunities. If there is such a thing as scientific management, meaning a new science of business, it certainly should devote itself to the problem of equalizing demand, or rather holding up the volume of trade to the level of the active season. It is interesting to note the methods which are being successfully used in a number of large establishments, for taking up such slack.

One of these manufactures a line of machinery for use in plants which have their own busy season in the summer. That means that the machinery manufacturer's busy time on this line is during the colder season, as it is of course out of the question to install equipment of this kind except during the off-season for its use. In other words, he has been up against the proposition for some time of finding a way to keep busy during the summer, when his staple line was inactive. He finally decided, after a thorough investigation of its possibilities, to put in a line of driers and presses used chiefly by distilleries, but also by other lines, such as grain-handlers and clay-workers. The chief reason for seeking the distilling trade was that those engaged in this business do most of their work in the winter, their season usually running from November to May; so that the time during which they could install new equipment and overhaul their plants generally was the very period when the machinery manufacturer could get no business on his other class of equipment. The two have worked in nicely thus far, and, as the question of building the machines was not difficult, from the standpoint of shop operation, the dovetailing of two classes of work which have no apparent relationship has been found highly advantageous.

Another large machinery concern has been confronted from time to time with the necessity of building up a side-line upon which to concentrate its energies during the off-season for its main product. The general manager reasoned that in its drop-forging equipment his company had made an investment hardly equaled by anybody else in its line in the country. Turning out forgings which any manufacturer requiring that class of material could use to advantage, he argued, "Why not develop jobbing work for this department, if not others, and keep that section of the plant busy during the dull season?" The scheme appeared feasible, and the first step was to compile a list of users of forgings such as those turned out in his own plant. These were called on and presented with the proposition of placing orders at a reasonably low price, in view of the character of the business, and enough trade was secured to enable the machinery to be run steadily during the greater part of the time when it could not have been used in making forgings for the company's own product.

Other energetic manufacturers have learned that if they are turning out a product which requires repairs, supplies and fittings from time to time, they can fill in the dull season by making these. That is to say, instead of making up a stock of parts during their regular season, even though that may be the time during which they are bought, such work can profitably be confined to the dull season, when the plant can be kept busy stocking up the warehouse with the supplies which will be called for a few months later. There is another angle to this plan of manufacture, in that it enables service to customers to be improved. There is nothing so irritating to the user of special machinery as to find that the manufacturer cannot supply parts or fittings as promptly as desired. It is well worth while piling up a good stock during the off-season, since this leaves the busy period open for work that cannot be done at any other time.

Some manufacturers who find it necessary in putting out new machines to take old ones in exchange make a point of rebuilding these and putting them on the market under a guarantee that they are in good condition and will stand hard usage. There is, of course, not so much profit in dismantling old machinery and replacing worn parts as there is in making new; for that reason such work is ordinarily put aside to await the slow times when the demand for the chief product of the manufacturer is sufficiently retarded to make other occupation desirable. Then the work of tearing down, repairing and reassembling of second-hand machinery which has been accumulating during the preceding months can be taken up, with the knowledge that the operation is serving a doubly useful purpose. It not only helps the factory to keep going at a normal rate, but it also aids the sales department, which can be kept busy on rebuilt goods during the season when the new lines are not moving satisfactorily.

Study of other lines of business than that in which the product of a manufacturer is regularly used may occasionally suggest a new line of consumption, the demands of which will be sufficient to fill in a dull month or two. A striking example of this has come under observation. A manufacturer of equipment used in stone quarries found that the all-steel derrick, which he had pushed successfully, could be used to advantage in sawmill yards. The lumbermen had been using wooden-beam derricks almost exclusively, but the machinery manufacturer found comparatively little difficulty in proving to the satisfaction of the sawmill operators that they could handle logs to better advantage with an all-steel derrick. The new field has since supplied some desirable business, which has enabled the builder to keep going during periods when the demand from the stone trade has been extremely light.

Getting around the obstacle of dull business means thorough study of the plant and its possibilities; of the field for the principal product, with reference to enlarging it, and of lines covering opposite seasons. It means versatility and more or less constructive imagination on the part of the manufacturer. But usually, when the problem is given the attention it deserves, the opportunity will be found for securing business which will help the dull period.

Strike Unlawful to Force Men to Join Union

W. W. Thornton, special judge in the Circuit Court, Indianapolis, Ind., has decided that a labor union may not legally declare a strike to force men to join it or to compel employers, by threatening their employees with dismissal, to force employees to join. The decision was in the case of the Keyless Lock Company against certain members of the Iron Molders' Union. A decree has been entered perpetually enjoining the members of the union from interfering with the affairs of the Keyless Lock Company and the defendants are to pay a judgment of $6,000.

The right of a manufacturer to operate an open shop where union and non-union men are employed was the issue in the case. The court held that a union can not legally order and further a strike for the purpose of unionizing an open shop. The Indiana Supreme Court has held that picketing, where it is done for a lawful purpose, is permissible and lawful, but in the Keyless Lock Company's case the Circuit Court holds that the end desired to be gained by picketing was unlawful and hence that the picketing was unlawful.

German Iron and Steel Exports Increase

Germany's imports and exports of all forms of iron and steel as well as machinery during the months of January to May, 1913, inclusive, compared with the corresponding period in 1912, were as follows in metric tons:

	Imports		Exports	
	1913	1912	1913	1912
Iron and steel	262,629	268,784	2,722,361	2,413,073
Machinery	39,397	36,025	225,094	204,329
Totals	302,026	304,809	2,947,455	2,617,402

While the imports of iron and steel fell off slightly in 1913 those of machinery increased, whereas the exports of both kinds of material showed a total increase of 330,000 tons.

The Cleveland office of the Detroit Stoker Company, Detroit, Mich., has recently received orders for two stokers for the Masonic Temple Building, Pittsburgh, to go with 250 hp. water-tube boilers; 200 hp. stokers for the Ohio Valley General Hospital, Wheeling, W. Va.; one 250 hp. stoker to go with a Keeler water-tube boiler for the Cleveland city farms at Warrensville and one 100 hp. stoker for the Cleveland Cut Floral Company.

A New Arc Welding Machine

Applying the Multiple Unit Principle to This Work—Interesting Repairs Possible

To enable defects such as shrinkage cracks, blow holes, etc., in castings to be remedied, and to repair breaks in street car trucks and locomotive frames, the C & C Electric & Mfg. Company, Garwood, N. J., has developed a line of electric arc welding machines. As is well known, electric arc welding differs from other forms in that an electric arc is used to produce a high temperature; the two pieces of metal to be joined are actually melted and flow together, instead of being merely softened by heat and then caused to unite by applying pressure or hammering. While hammering is often resorted to after the weld has been made, it is pointed out that this is merely to improve the ductility of the metal and is not depended upon to unite the particles. One of the fields in which the electric arc is employed is the welding of copper, brass, etc.

In making welds by this method, the usual practice is to connect the work to be repaired to one wire from the electric circuit and to attach the other to an electrode handled by the operator. The electrode is first brought into contact with the work, establishing the circuit, and is then drawn away to form an arc. When the electrode is moved over the work the arc will follow, thus enabling the operator to concentrate the heat on one spot or to spread it over a wide area. Theoretically, any source of direct current is suitable for this kind of welding, but as only a potential of from 10 to 60 volts is required at the arc a considerable amount of energy is dissipated in heating up the resistance required to reduce the voltage of the ordinary shop circuits. The new outfit of the C & C Electric & Mfg. Company is designed to overcome this difficulty, and consists of a motor-generator set and the necessary automatic controlling apparatus. In this way the shop circuit, whether of alternating or direct current, is changed to the proper voltage for welding, and at the same time, it is pointed out, precautions are taken against the short-circuiting of the machine. A view of this machine in the portable type is given in Fig. 1.

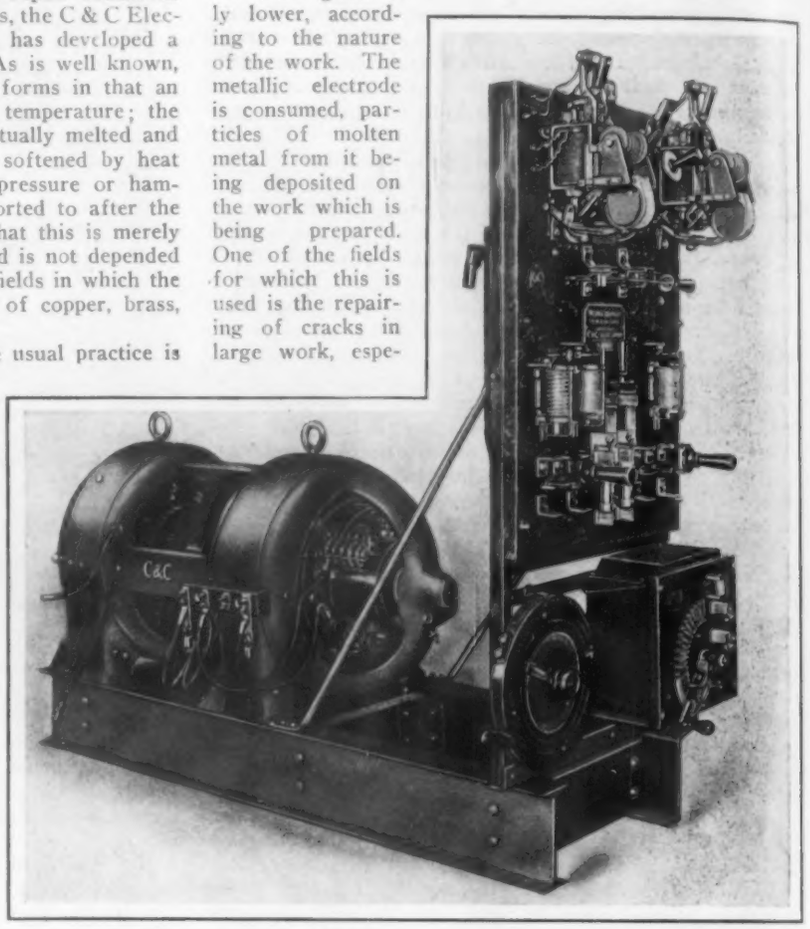


Fig 1—A Portable 300-Ampere Multiple Unit Welding Machine

Either graphite or metallic electrodes can be used for doing electric arc welding. With the former, a potential of 50 to 60 volts is required at the arc, and a current of 300 amperes can be used for all kinds of welding, filling in, building up, cutting, etc. In this method the filling-in metal is supplied from an outside source, the operator generally having either a rod of soft iron or steel or using scrap metal which the arc reduces to a state of fusion and forms into a homogeneous mass with the part being repaired. With the metallic electrode, the potential of the arc is generally lower, according to the nature of the work. The metallic electrode is consumed, particles of molten metal from it being deposited on the work which is being prepared. One of the fields for which this is used is the repairing of cracks in large work, especially in vertical or overhead surfaces, the new machine automatically changing from one type of electrode to the other. In this way it is possible for the operator to use a double electrode holder, the graphite electrode being employed for heating the work up, and then by pressing a button in the base of the holder to change over to the metallic electrode for the welding operation proper.

When contact is made between the electrode and the work, a short-circuit occurs, which is likely to either burn

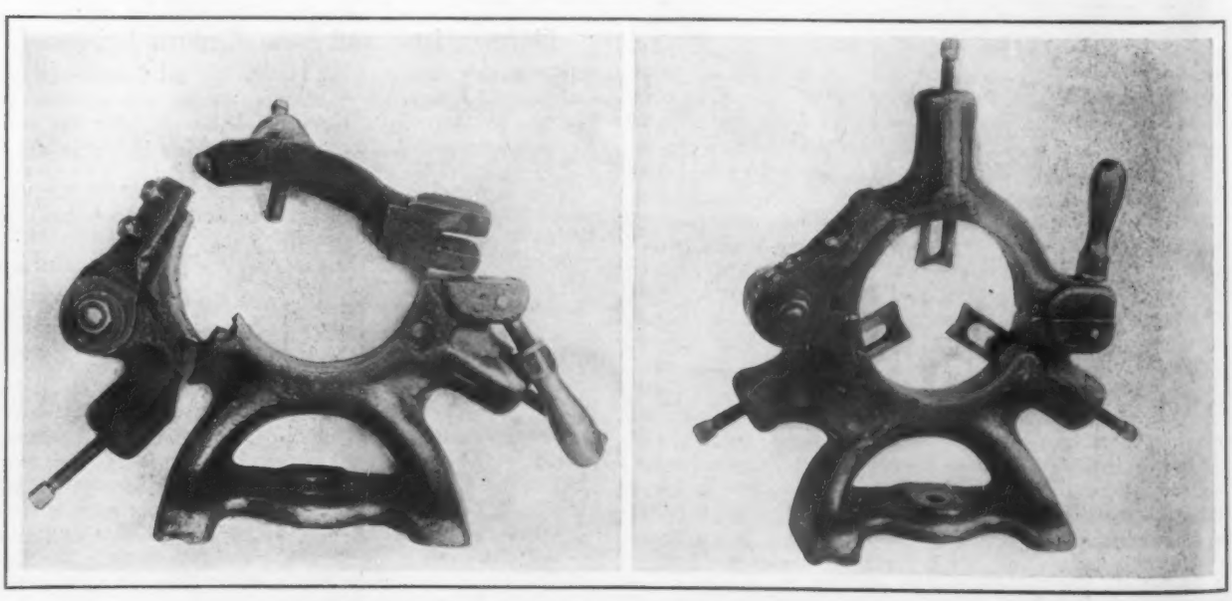


Fig. 2—A Broken Lathe Steady Rest Repaired by Electric Welding

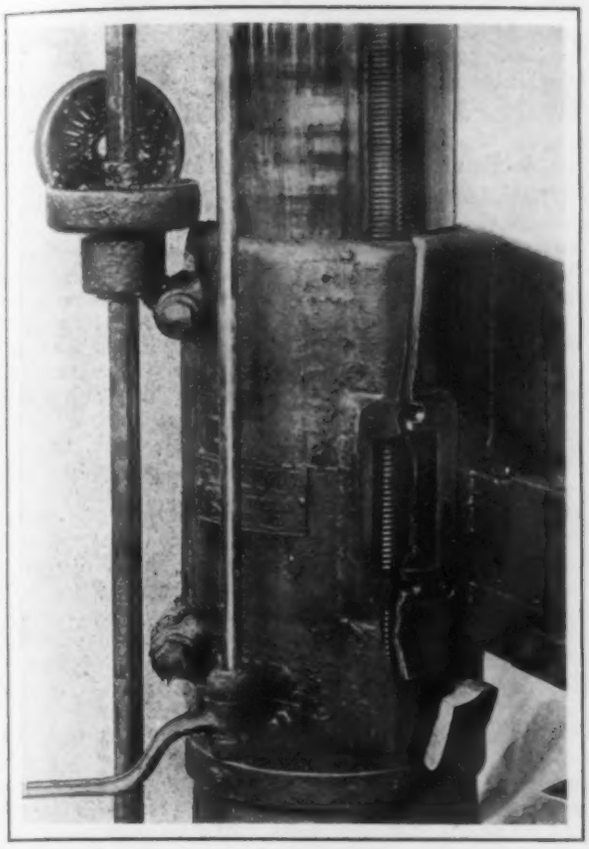


Fig. 3—A Cast-Iron Housing Supporting the Arm of a Radial Drilling Machine Broken into Three Parts

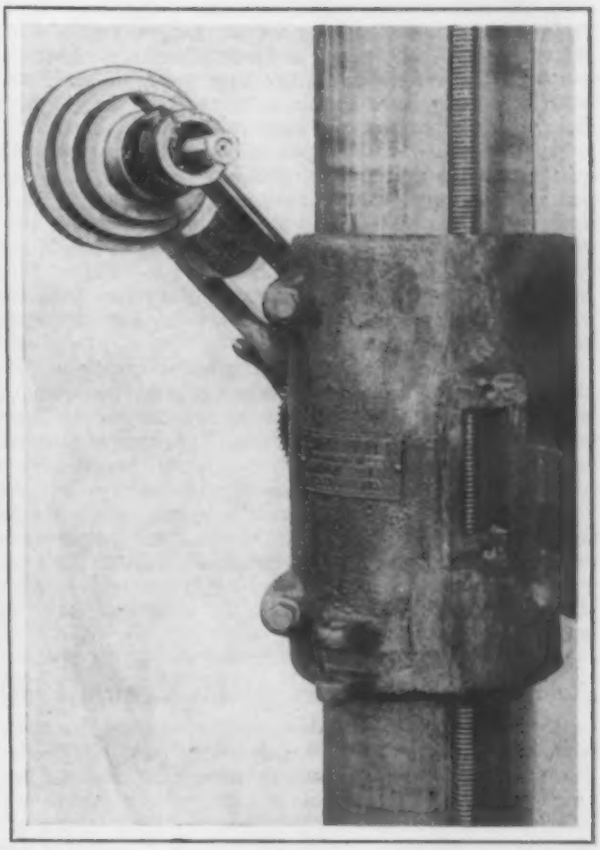


Fig. 4—View of the Housing Shown in Fig. 3 After Being Repaired by Welding

out the generator or trip the motor circuit breaker. To prevent this from happening an automatic series relay is employed which inserts a resistance in series with the electrode whenever the welding circuit is broken. As soon as the electrode is brought into contact with the work only sufficient current is permitted to pass to form the arc, and when that is drawn the resistance is automatically cut out of the circuit, so that practically the full potential of the welding circuit is applied between the electrode and the work. This arrangement, it is emphasized, results in great economy, as only from one-sixth to one-half of the current employed at the welding point is taken from the supply mains.

Other advantages claimed for this new machine are rapidity and flexibility. It is stated that once the proper voltage and current have been determined, the automatic features on the switchboard render it unnecessary for the operator to make any adjustment, regardless of how frequently the arc may be disrupted due to temporary overloads or other causes. It is also possible for two operators to work from the same machine, and it is possible for one to use a graphite electrode and the other a metallic one or vice versa.

These machines can be used for making repairs in a number of different industries, such as locomotive repair shops and rolling mills, in the manufacture of tanks and boilers, for bending and building pipes, in foundries and forge shops, and for cutting in scrap yards and for removing the steel framework from old buildings. Figs. 2 to 5, inclusive, show the varied character of the repairs which can be made by these machines. Fig. 2 is a view of a broken steady rest for a lathe before and after it was repaired, and Figs. 3 and 4 illustrate a repair which was made to a cast-iron housing supporting the arm of a radial drilling machines. As will be noticed from Fig. 3, the housing was broken into three parts. The repair was satisfactorily accomplished, and the machine has been in continuous service for about two years since it was repaired. This housing was not welded by the machine now on the market, but was done by one of the earlier types. Fig. 5 shows one of the many kinds of repairs that can be accomplished satisfactorily in rolling mills. The 9-in. beam roughing roll illustrated was worn 7/8 in. in the first pass and was built up to the full diameter by electric welding with extra stock for machining.

The machine can also be used for cutting by employing the graphite electrode, which concentrates the heat at a given point. It is possible to use this system of welding in scrap yards for cutting up large pieces of scrap and reducing them to charging and salable sizes. It is stated that a large locomotive boiler of the soft coal type can be cut up ready for shearing in from 6 to 8 hr. by one man, at a cost of not over $9, assuming that the cost of the current is 2c. per kw-hr. It is possible to cut up pieces of this character either by cutting through the metal or by cutting off the rivet heads, so that drifting is rarely neces-

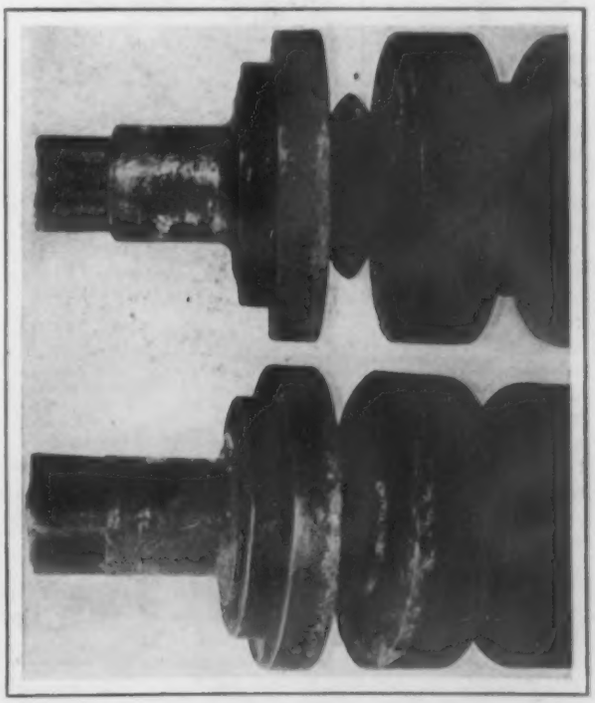


Fig. 5—Views of a 9-In. Beam Roughing Roll Before and After Being Built Up to Its Full Diameter by the Welding Process

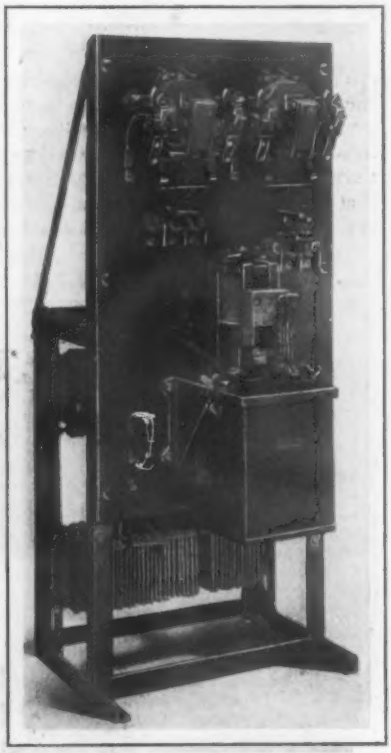
sary. Locomotive and engineering shops, shipyards, etc., in addition to using a welding set for general repair work, can dispose of their scrap to better advantage when it is cut into salable sizes, and other large pieces of scrap that may be cut up more economically, are long lengths of I beams, bridge girders, old steel rails, boilers, etc.

In steel and iron foundries, it is possible to repair any of the common defects in steel castings, such as shrinkage cracks, blow holes, short runs, sand holes, etc. These repairs, it is emphasized, can be made in a very short time and at a low cost, a shrinkage crack of 6 in. in length and 1 in. in depth being welded in in from 5 to 10 min. It is also possible to cut risers, gates and heavy fins from the castings, risers measuring 4 x 4 in. being cut off in approximately 3 or 4 min.

One of the fields in which the machine can be used is the repairing of broken machinery and the restoring of defective forgings in forge shops. With one of these machines, it is possible to repair the piston rods of plungers in large steam hammers which usually break at the shoulder at the junction of the tapered portion and the larger diameter, by welding the piece which broke away to the main portion of the plunger. Cracked and worn dies can also be repaired by either filling up the worn parts or welding the two sections together, only a little dressing with a cold chisel and file being generally required.

Automatic High Voltage Motor Control Panel

Power companies distribute electric current in cities at 1100 and 2200 volts, so that the use of motors designed for these voltages eliminates the necessity of step-down transformers. For that reason high voltage motors are being used to a great extent in industrial plants for compressor service, pumps, etc. For use with the high voltage slip ring induction motors employed for this work, the Cutler-Hammer Mfg. Company, Milwaukee, Wis., has brought out a new line of automatic control panels. Two types of panels are built, one of which is designed especially for use with motors for driving reciprocating pumps, air compressors or other machines, which must be started under full load conditions, and which require a starting torque either equal to or in excess of the normal full load torque of the motor. The other panel, which in general appearance is practically the same as the one illustrated, is intended for use on motors driving centrifugal pumps or machines of similar load characteristics, where the starting load is light.



A New Type of Control Panel for 1100 and 2200 Volt Motors in Which the Starting Resistance is Automatically Cut Out of the Circuit by Relays

Resistance in each of the three phases of the rotor circuit, which is cut out step by step by double pole magnetic switches under the control of current relays, regulates the rate of acceleration. The starting current can be set at any predetermined value by adjusting the relays, and the motor is accelerated in as short a time as is consistent with this current. The high tension primary motor circuit is controlled by an oil-immersed solenoid-operated three-pole switch, which is also mounted on the panel. Where the motors are used for driving pumps or compressors designed to operate between certain predetermined limits, accessories such as float switches, gauge and diaphragm type pressure regulators and vacuum regulators can also be used.

Electrolytic Corrosion of Iron in Soils

In technological paper No. 25, Bureau of Standards, Burton McCollum and K. H. Logan give the results of an investigation of the fundamental laws governing electrolytic corrosion of iron in soils. These are expressed in terms of electrolytic corrosion efficiency. Temperature changes within the limits commonly met with in practice, the amounts of oxygen present in the soil, and the depth of burial of pipes below the surface, have no material effect on corrosion efficiency. The pitting of imbedded iron is affected, not only by a non-homogeneous condition of the iron itself, but also by chemicals contained in the soils. Nitrates cause fairly uniform corrosion, but certain others, chlorides in particular, much greater pitting effects. Oxygen, while not affecting appreciably the corrosion efficiency, does cause a marked difference in the character of the end products formed. When the corrosion is rapid and the supply of oxygen small, magnetic oxide is the principal product, while if the corrosion is slow and the oxygen plentiful, ferric oxide will predominate. From this the rate of corrosion can sometimes be judged and indirectly the cause, if local conditions are properly considered. So long as physical conditions are similar, there is no material difference in the efficiency of corrosion of various kinds of iron commonly incorporated in underground pipes. In actual practice, however, wide variations of corrosion in all kinds of iron may be expected, and the results of a large number of tests show that under most practical conditions the corrosion efficiencies will range between 50 and 110 per cent. Corrosion is affected considerably by moisture in the soil, being greater with increasing moisture.

A Metallurgical Microscope.—A stereoscopic binocular microscope, made by E. Leitz, London, according to specifications of Wesley Lambert, late chief metallurgist to the Royal Gun Factory, Woolwich, is intended especially for the examination of metals at low magnifications. Two Greenough microscope tubes are so arranged as to bring the object under examination into focus in the axis of each tube, carrying an objective and an ocular. The two objectives are mounted on a single slide, the lenses being carefully paired, and so adjusted that the object can be brought into focus for each eye separately, thus correcting any slight difference between the eyes of the observer. The microscope is substantially mounted and can be tilted through 90 deg. The upper portion of the instrument can be detached and reversed, thus rendering possible the examination of bulky specimens too heavy for the stage or too large for the microscope to be mounted above them.

The U. S. Metal & Manufacturing Company, 165 Broadway, New York, has added to its line of railroad specialties the sale of the Lincoln arc welding and cutting machines, products of the Welding Materials Company. These machines will weld cracks and seams in locomotive fire boxes, flues in the sheet, engine frames, mudrings, wheel spokes and other work of similar character, incidental to steam railroad material; broken motor cases, truck frames, broken and worn armature shafts, gear cases, brake levers, etc., worn and disintegrated frogs and crossings; steel, gray iron and malleable castings, and will cut off heads, risers, mis-runs, rails, etc., and wreck steel structures, cut up scrap boilers, etc.

Corrosion tests on several metals have recently been made by the New York Board of Water Supply. The samples were buried in the earth six months and the earth periodically moistened with dilute solutions of corrosive salts. The losses of each metal were as follows: Phosphor bronze, 0.09 per cent.; Tobin bronze, 0.11 per cent.; Monel metal, 0.12 per cent.; manganese bronze, 0.12 per cent.; Muntz metal, 0.33 per cent.; steel, 1.04 per cent. The Monel metal presented the best appearance after the trial.

An Electric Clam Shell Bucket

Device with Self-Contained Mechanism for Foundry and General Use

Several features of interest are contained in a newly designed electric motor operated clam shell bucket manufactured by the Hayward Company, 50 Church street, New York City. The bucket is especially adaptable for use in foundries and manufacturing plants, although it is equally applicable for handling concrete and for a variety of contracting work. It is actuated by an electric motor of small horsepower placed in the head of the bucket. As will be seen at once, it can be used on any machine having but one hoisting drum, and the makers assert that it will work under the same conditions, except under water, and dig the same material as the other types of Hayward buckets. It is made in sizes from 3/4 cu. yd. up, and operated by either a direct or alternating current motor.

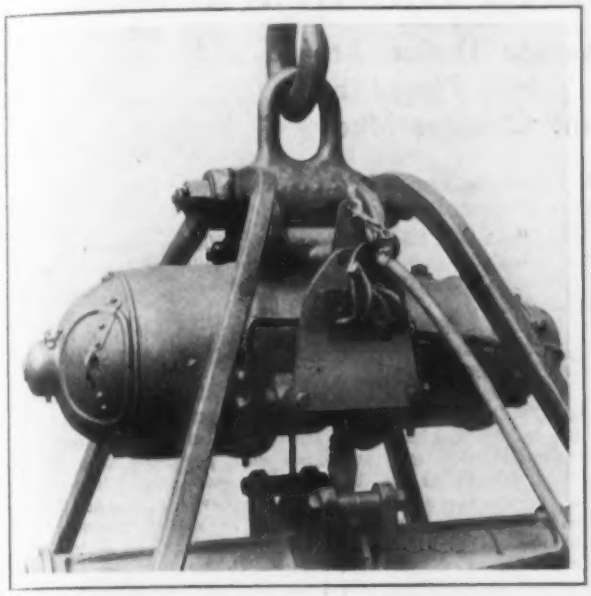


Fig. 1—Casing Which Contains the Electric Motor and Other Hoisting Mechanism of New Hayward Bucket

The blades, blade arms, connecting rods, in fact, all parts of the electric bucket are the same as on the other Hayward clam shell buckets with the exception of the closing power. The upper casting is a solid casting, the upper end of which is an eye made to receive the hook of the hoisting block attached to the operating machine. The electric motor is contained, with other mechanism, in a casing which protects it from the weather and dust. The casing is shown in Fig. 1. Inside the casing, besides the motor, are an electric brake gear, disk clutch and winding drum, all on a central shaft. Handholes are provided at one end for easy access to the working parts of the motor itself, and when occasion arises for an overhauling it may be accomplished quickly and with a minimum amount of trouble. By removing two bolts which hold the casing to the head of the bucket, it may be entirely detached; disconnecting four other bolts divides the shell or casing in two parts, which leaves the working parts entirely exposed.

The plug to which is attached the cable which conveys current to the motor is connected to the bucket as shown in Fig. 1, and its location is such that it cannot easily come in contact with anything that would be liable to dislodge it. The strain on the cable is taken by a snap hook.

On the shaft which passes through the blade arms is located a sheave incased in a casting, the latter performing the double duty of protecting the sheave and acting as a counterweight to open the bucket. The closing is accomplished by a two-part wire rope line or chain, one end of which is fastened to the motor casing. It then passes down over the sheave and back to the winding drum. Both opening and closing are done entirely by the motor, which is usually operated by the crane man, although the controller may be placed in any convenient location. As the closing and opening of the bucket is done independently of the operating machine, it is necessary to have but one hoisting drum and this, of course, can be made up of as many parts of line as desired. This allows a machine of small hoisting capacity on a single line to use an electric bucket of large capacity when the hoisting line is reeved through two double blocks. The buckets can be used on overhead electric traveling cranes around shops, it only being necessary to hang the bucket on the hook and plug in the electric cable to make it ready for work. At all times it is under the control of the operator and the load may be dumped as gradually as desired and without the shock of instantaneous discharge. A full load may be discharged in a dozen or more different places, which is an advantage in foundries when molding sand is being placed in flasks that would be too small to hold the entire contents of the bucket. Fig. 2 shows the bucket in use in a foundry.

Other advantages claimed for the bucket are that it works within its own headroom, requiring no waste space for closing lines; that it can be operated by one man, that it will dig anything from a shovelful to its rated capacity, and that there is no shock to the mechanism when the load is discharged in its entirety or in part.

Overloading the motor is guarded against by means of the disk clutch already referred to, which is adjusted to slip before the danger point of overloading is reached. Should the current be kept on too long or the bucket grasp something, while closing, which should prove too large for it to handle, the clutch slips. This arrangement eliminates the use of circuit breakers and limit switches, thereby simplifying the construction. In the opening operation when sufficient line has been wound out to open the bucket to its fullest extent, an automatic stop prevents the opening and closing line from rewinding on the drum. In other words, the motor rotates but the drum stands still when the bucket is wide open, no matter in what position the lever on the controller may be. This stop is positive in action, the dog or latch being thrown into engagement by the opening and closing line when the bucket has opened to its maximum spread.

Fig. 2—Hayward Electric Clam Shell Bucket as Used for Handling Sand in the Foundry

A rheostatic type of controller is used, arranged for from two to four speeds each way. The current is conducted to the bucket by a small waterproof cable. The

operation of the bucket is simple. When the controller handle is thrown one way the bucket commences to close, stopping automatically when closed. The reverse operation opens the bucket. An automatic cable take-up reel is furnished in cases where an extra amount of cable is required. It is made to carry up to 500 ft. of cable and may be located in almost any convenient position. It is actuated by spiral springs located on the main shaft. The tension on the springs to get the desired pull on the cable is varied by a small ratchet. The usual tension for drums carrying up to 150 or 200 ft. of cable is approximately 35 lb.

Underwood-Simmons Tariff Bill in the Senate

As Reported, the Average Duties Are Lower than in the Bill Which Passed the House—Some Important Changes Made

WASHINGTON, D. C., July 16, 1913.—The Underwood-Simmons tariff bill is now on the calendar of the Senate as unfinished business. Senator Simmons, chairman of the Senate Finance Committee, expresses the opinion that the bill will pass the Senate after about five weeks' debate. Republican Senators, he says, have assured him that there would be no disposition on the part of the Republican side to filibuster against the measure.

The Democratic members of the Finance Committee contend that the committee has reduced the average ad valorem rate of duty nearly 10 per cent. below that carried by the bill as it passed the House and that it has increased the prospective revenue from the bill about $5,000,000. The administrative features of the bill as reported are lengthy and complex. Senator Smoot, the ranking Republican member of the Finance Committee, states that the administrative sections will lead to endless litigation, and Treasury Department experts agree with him upon this.

So far as can be ascertained, the Democratic members of the Finance Committee paid no attention to the statements and briefs presented to them by producers of iron and steel and by the metal trade generally. The rates in the metal schedule in the Underwood-Simmons bill are lower than when the bill passed the House.

The income tax section provides for the collection of 1 per cent. on the net income of corporations, joint stock companies or associations, etc., and for 1 per cent. on incomes over $3000. Certain exemptions are made in the case of married men, etc. W. L. C.

The Metal Schedule Changes

The metal schedule as reported to the Senate has a number of changes from the draft which was printed as a supplement to *The Iron Age* of June 26. These changes, while of importance, are not deemed sufficient to make it necessary to reprint the entire metal schedule. The rates of duty on steel bars, etc., in paragraph 112 have been raised in the first section of the paragraph from 6 to 8 per cent. and in the second section from 10 to 12 per cent. In paragraph 116, the 30 per cent. duty on wire cloth has been made to apply to steel as well as copper, brass and bronze cloth. The rates of duty on automobiles in paragraph 121 have been elaborated by inserting another classification by which a rate of 15 per cent. is to apply on finished automobiles valued at $1000 or less.

A very important change has been made in the duty on cast-iron pipe, which when reported to the Democratic Senatorial caucus showed an advance from 12 to 15 per cent. The bill now shows that cast-iron pipe of every description has been placed on the free list. In paragraph 133 machine-cut files have been reduced from 25 to 20 per cent. In paragraph 142 all wood screws have been made subject to a duty of 25 per cent., whereas the bill as reported to the caucus imposed a duty of only 5 per cent. on screws not more than one-half inch in length and of 10 per cent. on those over one-half inch and not more than one inch in length. In paragraph 144 all railroad wheels have been reduced from 25 to 15 per cent. The rate of duty in the so-called "basket" clause, covering metal manufactures not otherwise provided for, has been reduced from 25 to 20 per cent. The paragraphs of the metal schedule showing changes from the phraseology or the rates published in *The Iron Age* of June 26 are reproduced below, the figures in parentheses being the rates in the bill as it passed the House:

105. Muck bars, bar iron, square iron, rolled or hammered, round iron, in coils or rods, bars or shapes of rolled or hammered iron and all iron not specially provided for in this section, (8) 5 per cent. ad valorem.

109. Hoop, band, or scroll iron or steel not otherwise provided for in this section, and barrel hoops of iron or steel, (12) 10 per cent. ad valorem.

112. Steel bars, and tapered or beveled bars; mill shafting; pressed, sheared, or stamped shapes, not advanced in value or condition by any process or operation subsequent to the process of stamping; hammer molds or swaged steel; gun-barrel molds not in bars; all descriptions and shapes of dry sand, loam, or iron molded steel castings, sheets, and plates; all the foregoing, if made by the Bessemer, Siemens-Martin, open-hearth or similar processes, not containing alloys, such as nickel, cobalt, vanadium, chromium, tungsten or wolfram, molybdenum, titanium, iridium, uranium, tantalum, boron and similar alloys, (10) 8 per cent. ad valorem; steel ingots, cogged ingots, blooms and slabs; die blocks or blanks; billets and bars and tapered or beveled bars; pressed, sheared, or stamped shapes not advanced in value or condition by any process or operation subsequent to the process of stamping; hammer molds or swaged steel; gun-barrel molds not in bars; alloys used as substitutes for steel in the manufacture of tools; all descriptions and shapes of dry sand, loam, or iron molded castings, sheets, and plates; rolled wire rods in coils or bars not smaller than twenty one-hundredths of one inch in diameter, and steel not specially provided for in this section, all the foregoing when made by the crucible, electric, or cementation process, either with or without alloys, and finished by rolling, hammering, or otherwise, and all steels by whatever process made, containing alloys such as nickel, cobalt, vanadium, chromium, tungsten, wolfram, molybdenum, titanium, iridium, uranium, tantalum, boron, and similar alloys, (15) 12 per cent. ad valorem.

115. Rivet, screw, fence, nail, and other iron or steel wire rods, whether round, oval, or square, or in any other shape, and flat rods up to 6 inches in width ready to be drawn or rolled into wire or strips, all the foregoing in coils or otherwise, including wire rods and iron or steel bars, cold rolled, cold drawn, cold hammered, or polished in any way in addition to the ordinary process of hot rolling or hammering, not specially provided for in this section, 10 per cent. ad valorem: Provided, that all round iron or steel rods smaller than twenty one-hundredths of one inch in diameter shall be classed as wire.

116. Round iron or steel wire; wire composed of iron, steel, or other metal, except gold or silver, covered with cotton, silk, or other material; corset clasps, corset steels; dress steels, and all flat wires and steel in strips not thicker than seven one-hundredths of one inch and not exceeding 5 in. in width, whether in long or short lengths in coils or otherwise, and whether rolled or drawn through dies or rolls, or otherwise produced; telegraph, telephone, and other wires and cables composed of metal and rubber, or of metal, rubber, and other materials; iron and steel wire coated by dipping, galvanizing, or similar process with zinc, tin, or other metal; all other wire not specially provided for in this section and articles manufactured wholly or in chief value of any wire or wires provided for in this section; all the foregoing (20) 15 per cent. ad valorem; wire heddles and healds, and wire rope, (30) 25 per cent. ad valorem; steel, copper, brass, and bronze woven wire cloth, 30 mesh and above, 30 per cent. ad valorem.

121. Finished automobiles, valued at $1500 or over, and automobile bodies, 45 per cent. ad valorem; finished automobiles valued at less than $1500 and more than $1000, 30 per cent. ad valorem; finished automobiles valued at $1000 or less, 15 per cent. ad valorem; automobile chassis, and finished parts of automobiles, not including tires, 30 per cent. ad valorem.

127. Cast-iron andirons, plates, stove plates, sadirons, tailors' irons, hatters' irons, and castings and vessels wholly of cast iron, including all castings of iron or cast-iron plates which have been chiseled, drilled, machined, or otherwise advanced in condition by processes or operations subsequent to the casting process but not made up into articles or finished machine parts; castings of malle-

able iron not specially provided for in this section; cast hollow ware, coated, glazed, or tinned, 10 per cent. ad valorem.

143. Files, file blanks, rasps, and floats, of all cuts and kinds, machine cut, 20 per cent. ad valorem; hand-cut files and files of precision, 35 per cent. ad valorem.

142. Screws, commonly called wood screws, made of iron or steel, 25 per cent. ad valorem.

144. Wheels for railway purposes, or parts thereof, made of iron or steel, and steel-tired wheels for railway purposes, whether wholly or partly finished, and iron or steel locomotive, car, or other railway tires or parts thereof, wholly or partly manufactured, (25) 15 per cent. ad valorem: Provided, that when wheels for railway purposes, or parts thereof, of iron or steel, are imported with iron or steel axles fitted in them, the wheels and axles together shall be dutiable at the same rate as is provided for the wheels when imported separately.

138. Pens, metallic, not specifically provided for in this section, 8 cents per gross; with nib and barrel in one piece, 12 cents per gross.

159. Penholder tips, penholders and parts thereof, gold pens, fountain pens, and stylographic pens; combination penholders, comprising penholder, pencil, rubber eraser, automatic stamp, or other attachment, 25 per cent. ad valorem: Provided, that pens and penholders shall be assessed for duty separately.

166. Bottle caps of metal, collapsible tubes, and sprinkler tops, if not decorated, colored, waxed, lacquered, enameled, lithographed, electro-plated, or embossed in color, 30 per cent. ad valorem; if decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 40 per cent. ad valorem.

169. Articles or wares not specially provided for in this section; if composed wholly or in part of platinum, gold, or silver, and articles or wares plated with gold or silver, and whether partly or wholly manufactured, 56 per cent. ad valorem; if composed wholly or in chief value of iron, steel, lead, copper, nickel, pewter, zinc, aluminum, or other metal, but not plated with gold or silver, and whether partly or wholly manufactured, (25) 20 per cent. ad valorem.

Free List Additional Paragraphs

450½. Cast-iron pipe of every description.

452½. Cement, Roman, Portland and other hydraulic.

The International Motor Company's Officers

At a recent meeting of the board of directors of the International Motor Company, Broadway and Fifty-seventh street, New York, John Calder was elected president, succeeding C. P. Coleman, resigned; Robert E. Fulton was elected vice-president; F. R. Phillips was appointed assistant to the president.

Mr. Calder is a mechanical engineer of much experience in design and construction, both in Europe and the United States, and an acknowledged expert in plant administration and industrial betterment. He has occupied high administrative positions, having been executive engineer of the C. W. Hunt Company, Staten Island, N. Y., manager of works and developer of the Remington Type Writer Company at Ilion, N. Y., for nine years, and associate manager of the Cadillac Motor Car Company, Detroit, Mich. He filled most acceptably the position of first vice-president of the International Motor Company and his promotion to the presidency was inevitable. Mr. Fulton, the new vice-president, is also general manager of sales and service. He was identified for some years with the Pope Mfg. Company in New York, and also with the Mercedes Company in the same city. After serving as New York sales manager of the International Motor Company he became its general sales manager. He is now making a tour of the country, visiting a number of new agencies and inaugurating new service ideas which the company is planning to install. Mr. Phillips has been responsible for the successful operation of the Saurer and Mack truck factories as general manager of works.

The International Motor Company is peculiar in having on its board of directors men of high distinction in finance and industry. Among them are E. C. Converse, president Astor Trust Company and Bankers' Trust Company; W. E. Corey, former president United States Steel Corporation; Otis H. Cutler, president American Brake Shoe & Foundry Company; Frederick H. Eaton, president American Car & Foundry Company; Ambrose Monell, president International Nickel Company, and Charles H. Sabin, vice-president Guaranty Trust Company.

The equipment for the industrial railway installed at the plant of the Gurney Electric Elevator Company, Honesdale, Pa., which was described in *The Iron Age*, July 10, was furnished by the Ernst Wiener Company, 50 Church street, New York City.

Manufacturing Steel Gear Blanks by Stamping

Departing from the usual custom of sawing gear blanks from steel shafting, G. F. Mitchell & Son, Cleveland, Ohio, have successfully adopted a method of making the blanks by stamping out the disks on a press, using as stock full cold-rolled steel. By this process 5-in. gear blanks ½ in. in thickness are being stamped from steel strips 5 in. wide. It is stated that the method used has resulted in a great saving in the cost of making gear blanks, which is a very important factor in view of the large number of gears used in the automobile industry.

The blanks are made in two operations. The first operation consists in blanking out the disk from the stock. This leaves the edges of the disk irregular as the metal is likely to be cut on a pitch in places. The disk is then put on a leveling device somewhat similar to a drawing die. This device consists of a flattening cup made of vanadium steel. Under the cup is an ordinary rubber press bumper. The disk is placed in a cup in which it fits and the second operation consists of ramming the disk with a round 5-in. die, the size of the blank. This operation flattens out the metal in the blank, forcing it out around the edge so that the blank fits the inside of the cup and is true all around the circumference and center hole, and making a surface cut around the edge of the blank unnecessary. Were the ordinary method of flattening by using a steel bed is resorted to, it is stated that a hydraulic press would be necessary to secure the required blow and that the blank probably would be pressed out of shape around the edges. The stamping is done on a back-geared double pitman Toledo press with a pressure of 350,000 lb. and the leveling is performed on a Toledo inclinable press with a pressure of 150,000 lb. Each operation is done at the rate of 60 per min.

An order for 150,000 5-in. gear blanks is being filled by this method of manufacture for the Gray-Davis Company, Boston, Mass., for use in making automobile starters. A large press will be installed to make gear blanks ¾ in. in thickness in the same manner.

Steel Corporation Orders Shrink

The decline in unfilled orders on the books of the United States Steel Corporation for June, 517,005 tons, was somewhat larger than expected. At the end of June orders for 5,807,317 tons remained unfilled. This amount is just 29 tons behind the unfilled tonnage reported one year previous, but is a decline of 2,124,847 tons from the recent high record point of 7,932,164 tons, reported at the end of the calendar year 1912. The decrease of 517,005 tons for June compares with a decrease of 654,440 tons in May, 490,194 tons in April, 187,758 tons in March, 170,654 tons in February and 104,796 tons in January. The decline in unfilled orders began in January, December of last year showing a gain of 79,281 tons. The table below gives the unfilled tonnage for each month back to December 30, 1911, and previous to that for the end of each year.

June 30, 1913	5,807,317	October 31, 1911	3,694,328
May 31, 1913	6,324,322	September 30, 1911	3,611,317
April 30, 1913	6,998,762	August 31, 1911	3,584,085
March 31, 1913	7,468,956	July 31, 1911	3,695,985
February 28, 1913	7,656,714	June 30, 1911	3,361,058
January 31, 1913	7,827,368	May 31, 1911	3,113,187
December 31, 1912	7,932,164	April 30, 1911	3,218,704
November 30, 1912	7,852,883	March 31, 1911	3,447,301
October 31, 1912	7,594,381	February 28, 1911	3,400,543
September 30, 1912	6,551,507	January 31, 1911	3,110,919
August 31, 1912	6,163,375	December 31, 1910	2,674,757
July 31, 1912	5,957,079	December 31, 1909	5,927,031
June 30, 1912	5,807,346	December 31, 1908	3,603,527
May 31, 1912	5,750,983	December 31, 1907	4,624,552
April 30, 1912	5,664,885	December 31, 1906	8,489,719
March 31, 1912	5,304,841	December 31, 1905	7,605,086
February 29, 1912	5,454,200	December 31, 1904	4,696,203
January 31, 1912	5,379,721	December 31, 1903	3,215,123
December 31, 1911	5,084,761	December 31, 1902	5,347,523
November 30, 1911	4,141,955		

The H. W. Johns-Manville Company, manufacturer of asbestos roofings, packings, pipe and boiler coverings, etc., in accordance with its long-established policy of business expansion, has opened a branch office at Charlotte, N. C. This office, which is located in the Commercial Bank Building, is in charge of E. U. Heslop, who is assisted in covering the western section of North Carolina by P. J. McCusker and Paul W. Whitlock.

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A Significant Pig Iron Record

The production of coke and anthracite pig iron, as shown by *The Iron Age's* monthly blast furnace statistics reached a total of 16,348,774 gross tons in the first six months of 1913. In the second half of 1912 the production of coke and anthracite iron was 15,474,204 tons, making a total for the twelve months ending June 30 of 31,822,978 tons. Charcoal pig iron production in the second half of last year was 180,659 tons. We may estimate it, in the absence of official statistics, at 185,000 tons for the first six months of 1913, so that the total pig iron output of the country for the year ending June 30 was not far from 32,188,637 tons, nearly 2,500,000 tons in excess of the greatest production in a calendar year—the record of 29,727,137 tons made in 1912.

It will be of interest to compare the pig iron production of the first half of 1913 with that of other six months' periods in recent years. Beginning with 1909 we have the following showing:

Pig Iron Production of the United States by Half-Year Periods.

	1909-1913				
	1909	1910	1911	1912	1913
First half...	11,022,346	14,978,738	11,666,996	14,072,274	16,533,774*
Second half.	14,773,125	12,324,829	11,982,551	15,654,863	
Total	25,795,471	27,303,567	23,649,547	29,727,137	

*Estimating charcoal iron at 185,000 tons.

The figures show the marked place the year 1913 has taken thus far among the high production records of the industry. There is no exact basis, however, for comparing the consumption of the first half of this year and of the second half of last year. It is known that pig iron stocks were reduced in the latter period, while this year has seen some increase in those carried at merchant furnace yards. The less calculable factor—the stocks in the yards of foundries and other consumers—further complicates comparisons. There has been some depletion of warehouse stocks of finished material this year, and this fact, with what is known as to pig iron stocks and the scale of rolling mill operations, points to a larger consumption of all forms of iron and steel in the past six months than in the six months ended December 31. That, in view of the number and character of the influences that have worked against business expansion, is proof of the splendid vitality of the industry and of those which largely work up its products. It suggests, also, that with some of the untoward influences removed the present iron and steel capacity of the country that can be operated on a moderate price level is quite certain to have full employment for a considerable period.

The Cost of "Socializing" German Industry

It is an interesting fact and a significant one that the principal addresses on behalf of German engineers at the fifty-fourth general meeting of the Verein Deutscher Ingenieure at Leipzig, June 23, in the presence of representatives of the American Society of Mechanical Engineers, took a high stand on the treatment of machine shop labor. Professor Lamprecht, who really gave the keynote address, developed the thought that in modern industrial achievement the period of quantitative production has been passed and that what is now under way is the humanizing of industrial operations. He pointed out that moral and social evils have grown up in the brilliant material progress of the past generation and that now we are to

look for "an increasing emphasis on the moral relations of the two great classes necessary to enterprise—the employer who directs and the worker." Industrial development is passing from the first phase, which the speaker said was characterized by "the mere naturalistic motive" and is coming to the second phase, that of "idealistic achievement." Elsewhere the address referred to the second phase as the "moral self-purification of industrial development."

Another German paper to which prominence was given at the Leipzig meeting was that of G. Schlesinger, of the Royal Technical High School, Charlottenburg, dealing with scientific management in industry. The writer, while favorable to the Taylor system and its modifications, dealt with the question on the plane of thorough sympathy with the worker, with none of the disposition sometimes shown in discussions in our own engineering societies, to regard the workman as simply the human side of works mechanism. Professor Schlesinger made his meaning here quite plain in saying: "The machine has neither life nor brains nor feeling, nor a position in the social scale. With the workman the matter is quite different, especially under German conditions." In this last qualifying phrase is the same assertion of Germany's exceptional position in the matter of welfare work and accident prevention and compensation, that is to be found in all similar discussions, from German sources, of recent industrial development.

Something of the altruistic character of the two addresses mentioned may be attributed to the viewpoint of the technical school and the laboratory. But no different story of the marked advance in the condition of the German workman in the past decade or two is told by the statistics of wages and of accident benefits. Only a few days after the Leipzig meeting, the American engineers were welcomed to Düsseldorf by Fr. Frölich, secretary of the Association of German Machinery Works. In an address reviewing the growth of the iron and machinery industries of Rhenish Westphalia, Secretary Frölich gave some significant figures on the steady and practically uninterrupted increase in wages which has taken place. In the mining industry, the average annual wage was 987 marks (about $245) in 1890; it had grown to 1520 marks (about $380) in 1911, or an increase of 54 per cent. At the same time, with an increase in the number of employees from 215,965 to 504,466 in the 21 years, the total of accident pensions grew from 2,003,881 marks to 17,227,698 marks, an increase of over 750 per cent. In the iron industry, in the same period, the increase in wages was from a yearly average of 1096 marks (about $275) to 1604 marks (about $400), or over 45 per cent. Accident pensions rose from 616,110 marks a year for 87,537 employees to 5,126,072 marks for 183,928 employees. In the machine and hardware industries the average wage increased from 918 marks (about $230) in 1890 to 1545 marks (about $385) in 1911. In the same industries the accident pensions for 85,290 employees were 350,122 marks in 1890, against 3,246,617 marks for 205,210 employees in 1911.

That Germany is growing out of the place she has long occupied in the cheap wage class of manufacturing countries is the outstanding fact in recent industrial development there. Her workmen are better paid than ever, and the German system of insurance pensions and accident and sick benefits is figuring materially in the cost sheets of her manufacturers. The increasing use of machinery at German iron and steel works is a direct consequence of the appreciation of labor cost and the increasing burden of social legislation. The labor costs of the leading iron and steel countries of the world are coming closer together, and the calculations that were commonly made 15 and 20 years ago, tending to show exceptional advantages for one country or another must be very sharply revised to square with present-day conditions. This factor in future international competition in iron and steel may profitably be given more attention.

The Underwood-Simmons Metal Schedule

Elsewhere in this issue we present the changes made in the metal schedule of the proposed new tariff, as shown in the text of the bill reported to the Senate, and now ready for the consideration of that body. The Senatorial caucus has made quite a number of alterations in this schedule, mainly reductions in the rates agreed upon by the Senate Finance Committee and subsequently taken up by the caucus, but in some instances the rates have been slightly advanced.

One of the most peculiar changes, showing remarkable vacillation in the attitude of the majority members of the Senate, is in regard to the rate of duty to be imposed on cast-iron pipe. The Underwood bill, as it passed the House of Representatives May 10, imposed a rate of 12 per cent. ad valorem on all kinds of cast-iron pipe. The Senate Finance Committee raised the duty to 15 per cent. The Senatorial caucus completely reversed that action, putting this product on the free list. Why the cast-iron pipe industry should be subjected to unrestrained competition from foreign manufacturers of cast-iron pipe is not explained.

Manufacturers of wood screws will be somewhat relieved to observe that the duty on their product has been placed at the uniform rate of 25 per cent., instead of the original Underwood rates of 5 per cent. on screws not over one-half inch in length and 10 per cent. on screws over one-half inch and not more than one inch in length. The manufacturers of car and locomotive wheels have had their protection reduced from 25 to 15 per cent.

It is interesting to note that the Senatorial caucus dealt tenderly with the duties on lead and zinc-bearing ores. The Senate Finance Committee raised the House rate on lead-bearing ore from one-half to three-quarters of one cent per pound on the lead contained therein, and the duty on zinc-bearing ores from 10 to 12½ per cent. on the zinc contained therein. The caucus permitted this action to stand. There may be no significance in the fact that Missouri is a large producer of both lead and zinc-bearing ores and that Senator Stone of that State is a prominent member of the Senate Finance Committee and one of the leading majority members of the Senate. In view of the fact that other ores have been placed on the free list, however, the manner in which lead and zinc-bearing ores have been shielded from the competition of foreign ores is a prominent characteristic of a tariff schedule making drastic cuts in duties.

In a speech delivered in the Senate on Tuesday of this week Mr. McCumber, of North Dakota, justly characterized this tariff bill as having been "conceived in animosity against every American industry that needed protection," and this spirit appears to have governed the Senatorial caucus in the changes it has made

in the bill as it came from the House. The transfer of more finished products to the free list and the wiping out of differentials on highly finished products which have long been incorporated in every tariff bill for the purpose of covering additional labor costs are flagrant examples of this animosity against American manufacturers. Apparently, those who have been drafting or revising this bill have been determined to obliterate every semblance of protection to American industries. There appears to be no application of the old tariff reform idea of "incidental protection."

The Connellsville Coke Deadlock

The deadlock which began weeks ago between Connellsville coke operators and certain furnaces whose coke contracts expired June 30 arose from the fact that some Connellsville coke operations are based upon very much higher valuations for coal acreage than are others. It is not that the valuations in these cases are high; rather, that some are high while others are not. Had the entire Connellsville coke industry been based upon valuations of $1500 or $2000 an acre or more, the market would long since have adjusted itself to the condition, or, at the furthest, it would have written off the excess in the valuations, if there was any excess.

When the iron industry has been depressed, the price of Connellsville coke has fallen to a level not far from the bare cost of production, with no allowances for overhead charges or exhaustion of the coal. This year the furnacemen expected a similar decline, whereas the operators had new ideas upon the subject; the result was a deadlock, whereby for weeks operators have been demanding $2.50 for coke while furnacemen have insisted they would not pay more than $2 at the outside.

Judged by the conduct of the market, it seems to have been only very lately that the coke operators have come to realize that prices paid for coal acreage a few years ago require a very large annual allowance for interest upon investment and coal exhaustion, and that the average cannot be maintained by hitting the amount now and then. Either there must continuously be provided the funds, or in good years large excesses must be provided to make up for the lean years.

A veteran in the Connellsville coke industry, occupying a very high position in connection with the largest steel interest, is understood to have maintained at all times in the past that Connellsville coal acreage could not properly be worth more than $1000 an acre, whereas it is well known that very much higher prices have been paid, and several operations have been bonded for more than this amount per acre. Even at $1000 it may easily be computed that the interest and exhaustion charges are considerable. A life of much under 20 years cannot be figured for an operation, because when it is abandoned the investment in development becomes practically worthless. At 20 years, there must be provided about two acres per oven, the best output per oven of the most modern type being about 700 tons annually, while an acre, according to the figure accepted in the trade, yields about 7000 tons of coke. Thus for two acres at $1000 an acre, and attendant development cost, there would be about $3000, involving at 5 per cent. an annual charge of $150, while the depreciation, spread over 20 years, would be an equal amount, thus making $300 to be furnished by the marketing of 700 tons of coke a year, or 43 cents a ton. This, moreover, is on coal at $1000 an acre, whereas many investments are at much higher figures, while at various times the coke market has dropped to levels which allowed scarcely anything for interest, depreciation and exhaustion.

It is because certain operators, and the banking interests with which they are involved, realize this fact that the demand for $2.50 for coke is being made. On the other hand furnacemen have naturally expected the coke market to move in fairly close relation to pig iron, as iron ore has done, with some exceptions, in the fixing of yearly contract prices. Labor supply in the Connellsville region has not been abundant and this has aided the operators in maintaining their market. If blast furnace output should fall off further, a counter influence would be set in motion, for it is not to be expected that blast furnace and coke oven operations should long fare so differently in respect to profits as is the case to-day. With all the increase in his cost, the coke operator is now probably making a greater profit per ton than the furnaceman, though the product of the latter represents a market price six or seven times higher.

The Iron Age Index

The index to Volume 91 of *The Iron Age*, January 1 to June 30, 1913, has been compiled and printed and will be mailed to subscribers applying for it. A list of those who have received the index heretofore is kept in this office and to all such the latest will be mailed without notice from them. Additional names will be put on this list on request.

The Leipzig Structural Exposition

Impressions of a Notable Feature of the Mechanical Engineers' Visit in Germany

(*Staff Correspondence*)

LEIPZIG, GERMANY, June 25, 1913.—The party of the American Society of Mechanical Engineers now touring Germany is scheduled to go to Dresden this morning, Wednesday, after an exceedingly active sojourn here since Sunday evening. Before leaving the city a word should be said of the Leipzig Exposition. While spoken of in English as an architectural affair, its German designation is Baufach-ausstellung, a word itself hardly fully descriptive of what one may see. The very full programme gave practically no time for even a hurried survey of the numerous buildings, but a glimpse here and there is convincing that the show is well worth several days.

Naturally the main building is given up to inside and outside building construction, decoration and equipment, and in plan its extreme dimensions are about 500 x 650 ft. There are over 100 buildings, not half of which may be regarded as entertaining without having instructive or educational features, and this number does not include many smaller buildings occupied exclusively by exhibiting manufacturers and the like. Another large building is devoted to hygiene in building materials and furnishings. Another of considerable size is known as the Concrete building and exhibits the large place this material has taken in building work to-day, and there is also a surprisingly large number of both wood and metal working tools housed in two of the largest buildings and including even prime movers, such as steam and oil engines. A remarkable array of testing machines for various materials forms still another class of exhibits.

A Steel Syndicate Building

A special building, forming a prominent feature of the exposition, was erected by the Stahlwerks-Verband. More may be said of this later. In it are also accommodated exhibits of the associations of German bridge and structural builders. It is a lofty structure, octagonal in plan,

rising in three stories of successively smaller octagons, and the whole octagonal pyramid is surmounted by a large gold ball about 30 ft. in diameter. The first story, which is built around a circle over 80 ft. in diameter, houses the principal exhibits, which are remarkable models of steel plants (including Bessemer and open-hearth works), blast furnaces and rolling mills, and models of famous steel bridges.

Perhaps the most striking model is that of a two-high reversing blooming mill built by Haniel & Lueg, Düsseldorf, showing on a scale of 1 to 20 a mill with 45-in. rolls 9 ft. 2 in. long, even to the tilting machine for delivering ingots to the approach table and steam-hydraulic ingot shears. The exhibit is a working one operated by a concealed electric motor. The Mesta Machine Company, Pittsburgh, it will be recalled, has rights in the United States for patented products of Haniel & Lueg. The exhibit building as a whole stands in a large open space with a dull black outside, symbolic of the industry for which it stands; but its large glass windows and the large lettering of the names of the associations are embellished in gold. The interior is of white marble, black glazed tile and bronze.

One of the smaller buildings given up exclusively to the productions of a single firm is occupied for showing the Koppers by-product coke oven installations. Besides some illuminating models of the oven itself there is a large model of complete coal utilization, as in a gas works, including a coal-car dumper, boiler house and so on, with the building partly open or cut away to give views inside. A booklet in German relating to the exhibit may undoubtedly be had by addressing Heinrich Koppers, Essen (Ruhr), Germany.

An interesting exhibit is made, in the department given over to testing machines, by the Royal Saxon Mechanical and Technical Research Bureau, Dresden. A steel rail of about 100-lb. section was mounted on two supports 5m. or about 16½ ft. apart. At the middle point a delicately mounted galvanometer type of mirror was attached and a beam of light was directed on the mirror and the light reflected to a scale in full view of the spectator. A sign requests the visitor to press his finger on the rail and he will see the reflected light on the scale move. The exhibit is calculated to leave a lasting impression that deformation with stress is not an abstract thing to talk about, but something occurring with the lightest loads. No opportunity was available on the visit to ascertain at what minimum load the eye could discern a movement of the spot of light or at what load the delicate measuring device failed to respond; but it would seem that the finger did not exert a force of over 1 lb., and to have ocular demonstration that one could stress a heavy rail so easily gave renewed respect for man's prowess.

Notable among the exhibits in Machinery Hall were those of Henry Pels & Co., metal shears of a wide range of style and size; Stahlwerke Oeking, Düsseldorf, punches and shears; the Worthington-Blake Pumpen Compagnie m. b. H., this exhibit including a cooling tower; and of Actien-Gesellschaft Ferrum, Zawodzie bei Kattowitz, covering the Ferrum system of high-pressure large size pipe and pipe joints. A high-speed steel milling cutter of unusual character was shown by R. Stock & Co., Berlin-Marienfelde. The cutting edges take the form of a herringbone gear, yet these edges do not meet at the center, but those on one side alternate in position with those on the other side of the center. The edges of each side are also carried slightly beyond the center line, forming what may be called overlapping teeth. It is probable a circular illustrating the cutter may be had by addressing Hermann Haelbig, Dresden, A-3, Germany. The cutters are made in sizes of about 1½ to 4½ in. in diameter and 2 to about 7 in.

W. W. M.

The Harris Bros. Company, Chicago, formerly the Chicago House Wrecking Company, which recently acquired the plant of the Flanders Mfg. Company at Pontiac, Mich., has disposed of the electric car department to a new corporation which will operate it as a separate unit. The foundry and gear-making departments are also being disposed of in accordance with negotiations now under way and will be conducted independently. The Harris Bros. Company plans to retain the drop forge plant and operate it.

June Copper Production and Stock

The stock of copper on hand at the end of June, according to the monthly statement of the Copper Producers' Association, was 52,904,606 lb., a decrease of 14,659,619 lb. since May. Domestic consumption fell off to 68,452,571 lb., which is about 12,600,000 lb. less than that of May, and the export deliveries were also a little less than in the previous month. The June statement of the association compares as follows with that of the previous month:

	June, pounds	May, pounds
Stock of marketable copper of all kinds on hand at all points in the United States at first of month	67,564,225	75,549,108
Production of marketable copper in the United States from all domestic and foreign sources during the month	121,860,853	141,319,416
Deliveries of marketable copper during the month:		
For domestic consumption	68,452,571	81,108,321
For export	68,067,901	68,285,978
Total	136,520,472	149,394,299
Stock of marketable copper of all kinds on hand at all points in the United States at close of month	52,904,606	67,564,225

The small stock on hand is due to the large falling off in production, nearly 19,500,000 lb. less than in May. The prolonged strike at the Nichols refinery on Long Island was the largest factor in this. The report showed a greater shrinkage in stock than was expected by the trade.

It is necessary to go back to the four months of May to August, 1912, to find the American stock of copper as low as at present. Reducing the figures to gross tons, the following comparison is made: July 1, 1913—23,619 tons; June 1, 1912—22,151 tons; July 1, 1912—19,793 tons; August 1, 1912—22,446 tons; September 1, 1912—20,849 tons. After the latter date the stock increased rapidly for several months.

The publication of the above figures enables a computation of the world's total visible supply of copper at the close of June, which covers the stock of copper in the hands of American producers, the stock in England and France and afloat thereto from Chile and Australia, and stocks in Holland and Germany. The total was 61,815 gross tons. This is the lowest stock recorded since the beginning of the publication of stock reports by the Copper Producers' Association of this country. The lowest previous stock was at the close of June in 1912, when the figures were 67,931 tons.

British Iron Ore Imports

The imports of iron ore, not including manganese ores, into the United Kingdom of Great Britain for 1911 and 1912 are as follows in gross tons. It will be seen that Spain supplies about twice the amount shipped from all other countries:

From	1912	1911
Spain	4,139,028	3,753,539
Algeria	747,887	710,174
Norway	402,106	259,369
Sweden	355,455	426,241
Tunis	238,912	230,302
Greece	184,138	251,040
British possessions	34,758	75,864
Other countries	337,017	423,970
Totals	6,439,301	6,130,499

The production of iron ore in Great Britain in 1911, apart from that obtained in quarries, was 9,710,693 gross tons. In recent years the imports of iron ore have been about two-thirds of the domestic production.

The hydroelectric plant at Keokuk, Ia., which recently began service to St. Louis, Mo., will add 13,000 kw. to be delivered at Alton, Ill., within the next 15 days. The Mississippi River Power Company will deliver the current to the Clark Syndicate of Philadelphia, which controls the Alton public utilities and will step it down and deliver it to consumers.

The Eskbank Iron Works of the G. & C. Hoskins Company, Ltd., Lithgow, New South Wales, is now reported to be rolling rails successfully in large quantities for the trans-Australian railroad, the steel being unusually low in phosphorus and other impurities.

The Iron and Metal Markets

Brief Mill Shut-Downs

Pressure for Deliveries Continues

Increase in Structural Orders—Pig Iron Buying Movement Broadens at Low Prices

With few exceptions, chiefly in the case of isolated iron rolling mills, the shut downs at steel plants and finishing mills this year were limited to July 4 and the Saturday and Sunday following. The prompt resumptions last week indicate the pressure the continued large consumption is putting upon the mills, particularly in the heavier lines.

With the limitations imposed by money conditions, iron and steel works are dealing more and more with the country's upkeep requirements. It is the unknown factor, the time and the extent of the release of funds for new enterprises, that accounts for the diverse views entertained in the steel trade as to its course in the late months of the year. Cheerful views predominate, but this week Pittsburgh reports are less confident than heretofore.

It can at least be said that in most products the rate at which new orders are being booked has held up this month, in the case of the Steel Corporation amounting to nearly 25,000 tons a day, while one important bar interest has received new orders and specifications nearly equal to its capacity in that product.

The situation in wrought pipe is probably stronger than that in any other product, both as to prices and demand. In general the line is still to be drawn between heavier and lighter products, the latter showing weakness, while bars, plates and structural shapes maintain contract prices. These prices have been named on surprisingly prompt deliveries in some cases, however, and the large mills are making efforts for orders that a short time ago would have been passed by because of their small size and early deliveries.

The receiver of the Frisco system has bought 12,000 tons of open-hearth rails for this year, and while the Southern Railway inquiry for 28,000 tons is still pending, that road has placed a considerable order for splice bars. The Central Railway of Brazil has ordered 20,000 tons of rails.

Some structural business which has been held up for financing has been released. In New York City two printing buildings requiring 9400 tons of steel have been let; also the Altman store addition, 5000 tons. The Pennsylvania Lines West have awarded 4000 tons additional for overhead track work around Chicago.

In the Chicago district and the Central West closer competition in sheets has developed, as some of the mills have run out of orders, but buyers are not loading up. The situation in wire products has not improved, and while no new announcements as to prices have been made Pittsburgh reports an expectation that some change is impending.

The pig iron market has been more active, with lower prices on Northern iron in the East and Central West, while in the Chicago district local makers have withdrawn the lowest prices recently named. On Southern iron the minimum appears to be $10.50 Birmingham for No. 2, one interest credited with sales at a lower level now announcing $10.50 for delivery in the remainder of the year. Large inquiries are pending in nearly all districts, including 40,000 tons in and around Chicago, and it is expected that sales will be heavy in the coming week. In Ohio foundry iron has declined 25 cents. The buying movement is evidently broadening at the lower prices.

Bessemer pig iron has declined from $16 to $15.75, Valley furnace, a sale of 2500 tons being made at the latter figure. Basic pig iron is reported to have sold below $14.50 at Valley furnace. In Eastern Pennsylvania one buyer of basic closed for a total of 8000 tons, prices falling to $15.25 from a recent level of $15.50, and as low as $15, delivered, was done.

The railroads have met the requirement of the Commerce Commission that they equalize Pittsburgh and Wheeling rates on iron ore by raising the latter from 60 to 88 cents and reducing the former 8 cents from 96 cents. Wheeling district shippers will protest, and a lower common rate is expected.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	July 16, 1913.	July 9, 1913.	June 18, 1913.	July 17, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia.	*$15.50*	$15.75	$16.00	$15.75
Foundry No. 2, Valley furnace..	*13.85*	14.00	14.00	13.25
Foundry No. 2, S'th'n, Cin'ti...	13.75	13.75	14.00	14.75
Foundry No. 2, Birmingham, Ala.	10.50	10.50	10.75	11.50
Foundry No. 2, furnace, Chicago*	14.75	14.75	15.50	14.50
Basic, delivered, eastern Pa....	*15.00*	15.50	15.75	15.50
Basic, Valley furnace.....	*14.35*	14.50	14.50	13.50
Bessemer, Pittsburgh	*16.65*	16.90	16.90	15.15
Malleable Bessemer, Chicago*..	14.50	14.50	15.50	14.50
Gray forge, Pittsburgh.....	14.65	14.65	14.65	13.90
Lake Superior charcoal, Chicago	15.75	15.75	16.75	16.25
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh....	26.50	26.50	26.50	21.50
Open hearth billets, Pittsburgh..	26.50	26.50	26.50	21.50
Open hearth sheet bars.....	**27.50**	27.00	27.00	22.00
Forging billets, Pittsburgh....	34.00	34.00	34.00	28.00
Open hearth billets, Philadelphia	28.00	28.00	28.00	24.40
Wire rods, Pittsburgh.....	28.50	28.50	29.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	16.00
Iron rails, Philadelphia.....	17.50	17.50	17.50	16.50
Carwheels, Chicago	13.00	13.00	13.50	14.00
Carwheels, Philadelphia	*12.00*	12.50	13.00	14.00
Heavy steel scrap, Pittsburgh..	12.50	12.50	12.50	13.50
Heavy steel scrap, Chicago....	10.50	10.50	10.75	11.50
Heavy steel scrap, Philadelphia	*11.25*	11.50	11.50	13.50
Finished Iron and Steel,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	*1.42½*	1.47½	1.52½	1.32½
Iron bars, Pittsburgh	1.65	1.65	1.65	1.35
Iron bars, Chicago	1.50	1.50	1.50	1.35
Steel bars, Pittsburgh	1.40	1.40	1.40	1.25
Steel bars, New York.....	1.56	1.56	1.56	1.41
Tank plates, Pittsburgh.....	1.45	1.45	1.45	1.30
Tank plates, New York.....	1.61	1.61	1.61	1.46
Beams, Pittsburgh	1.45	1.45	1.45	1.30
Beams, New York	1.61	1.61	1.61	1.46
Angles, Pittsburgh	1.45	1.45	1.45	1.30
Angles, New York	1.61	1.61	1.61	1.46
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.20
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.25
Steel hoops, Pittsburgh	1.60	1.60	1.60	1.40
Sheets, Nails and Wire,				
Per Pound to Large Buyers:				
Sheet, black, No. 28, Pittsburgh	2.25	2.25	2.25	2.00
Wire nails, Pittsburgh	1.70	1.70	1.80	1.60
Cut nails, f.o.b. Eastern mills..	*1.75*	1.80	1.80	1.60
Cut nails, Pittsburgh	*1.65*	1.70	1.70	1.55
Fence wire, ann'l'd, 0 to 9, Pgh.	1.55	1.55	1.60	1.40
Barb wire, galv., Pittsburgh....	2.20	2.20	2.20	1.90

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt shipment	$2.50	$2.50	$2.15	$2.25
Furnace coke, future delivery..	2.50	2.50	2.25	2.25
Foundry coke, prompt shipment	2.75	2.75	2.75	2.40
Foundry coke, future delivery..	3.00	3.00	3.00	2.50

Metals,

Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	*14.50*	14.75	15.50	17.12½
Electrolytic copper, New York.	*14.12½*	14.50	14.87½	17.00
Spelter, St. Louis	*5.15*	5.25	4.95	7.15
Spelter, New York.....	*5.30*	5.40	5.10	7.30
Lead, St. Louis	4.20	4.20	4.20	4.60
Lead, New York	4.35	4.35	4.35	4.70
Tin, New York.....	**40.00**	39.35	44.75	43.62½
Antimony, Hallett, New York..	*7.75*	8.00	8.15	7.87½
Tin plate, 100-lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.40

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.50c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 2.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.50c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909..... .20 to	.80
Deck beams and bulb angles.....	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $28.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.50 to $1.60; galvanized, $1.90 to $2. Galvanized barb wire, to jobbers, $2.10 to $2.20; painted, $1.70 to $1.80. Wire nails, to jobbers, $1.70 to $1.80.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.70	$1.75	$1.80	$1.85	$1.95	$2.05	$2.15	$2.25
Galvanized ..	2.15	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from May 27, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜.....	72	51½	⅛ and ¼	66	47
½	76	65½	⅜	65	46
¾ to 3	79	70½	½	69	56
			¾ to 2½	72	61

Lap Weld.

2	76	67½	1¼	56	45
2½ to 6.....	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt.....	77	68½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	71	60
2½ to 4, lap.....	76	67½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap.....	68	59

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜.....	67	56½	⅜	63	52
½	72	65½	½	67	60
¾ to 1½.....	76	69½	¾ to 1½	71	62
2 to 3	77	70½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

½	62	55½	½	57	49
¾ to 1½	65	58½	¾ to 1½	60	52
2 to 2½	67	60½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		*Standard Charcoal Iron.*	
1¼ and 2 in.....	60	1½ in.....	44
2¼ in.	57	1¾ and 2 in.....	48
2½ and 2¾ in.....	63	2¼ in.	44
3 and 3¼ in.....	67	2½ to 2¾ in.....	53
3½ to 4½ in.....	69	3 and 3¼ in.	55
5 and 6 in.....	63	3½ to 4½ in.	58
7 to 13 in.....	60		

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.70
Nos. 9 to 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.95

Box Annealed Sheets, Cold Rolled

Nos. 10 and 11	1.90 to 2.00
No. 12	1.90 to 2.00
Nos. 13 and 14	1.95 to 2.05
Nos. 15 and 16	2.00 to 2.10
Nos. 17 to 21	2.05 to 2.15
Nos. 22 and 24	2.10 to 2.20
Nos. 25 and 26	2.15 to 2.25
No. 27	2.20 to 2.30
No. 28	2.25 to 2.35
No. 29	2.30 to 2.40
No. 30	2.40 to 2.50

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.35 to 2.50
No. 12	2.45 to 2.60
Nos. 13 and 14	2.45 to 2.60
Nos. 15 and 16	2.60 to 2.75
Nos. 17 to 21	2.75 to 2.90
Nos. 22 and 24	2.90 to 3.05
Nos. 25 and 26	3.05 to 3.20
No. 27	3.20 to 3.35
No. 28	3.35 to 3.50
No. 29	3.50 to 3.65
No. 30	3.65 to 3.80

Pittsburgh

PITTSBURGH, PA., July 16, 1913.

Local financial conditions are again normal, and no further trouble is expected. The First National Bank at McKeesport, which closed at the same time as the First-Second National, has opened up again and the run on the Pittsburgh Bank for Savings is entirely over, the bank coming through unscathed. Specifications against contracts for heavy products, such as steel bars, plates, plain structural material and lap weld pipe, are heavy and prices are firm, but on lighter forms, such as sheets, tin plate and wire products, are dull and prices are weak. Estimates place specifications coming in at about 60 per cent. of output, but all the leading mills have a large amount of work on their order books, and will not be badly in need of new business for two or three months. A moderate buying movement is looked for in the latter part of August or early in September, but if it comes it will be a demand for consumption only, as there is no incentive for consumers to anticipate, as prices are as high as they will be for some time, and the mills later on expect to be able to make prompt deliveries. There is a fair amount of inquiry for pig iron, but with no betterment in prices in spite of the fact that makers of coke are holding firmly at $2.50 at oven for furnace coke for July delivery. A moderate sale of Bessemer pig iron for this and next month brought out a price 25c. lower than what has been regarded as the regular market. The demand for billets and sheet bars is quiet, but the market is firm. The scrap trade is showing some signs of getting out of the rut it has been in for some time, and some business is under negotiation.

Pig Iron.—As yet no blast furnaces in the Pittsburgh or Valley districts have been blown out on account of the $2.50 price that is ruling for coke. The price of Bessemer iron has declined to $15.75 at Valley furnace, a sale of 2500 tons having been made at that price for July and August delivery. We also note a sale of 200 tons for prompt shipment at $15.85 at Valley furnace. Fairly heavy inquiries are out for basic iron and some business has been closed with more under negotiation. Sales aggregate 4500 to 5000 tons of basic for August, September and October delivery at $14.35, Valley furnace, or $15.25, Pittsburgh. The Standard Sanitary Mfg. Company will likely close this week for 4500 tons of foundry iron. A radiator company inquiring for 5000 tons has not yet bought. Other inquiries for foundry iron aggregate 5000 to 6000 tons. These inquiries are bringing out lower prices. We quote Bessemer iron at $15.75; basic, $14.35; malleable Bessemer, $14.25; No. 2 foundry, $13.85 to $14, and gray forge $13.75, all at Valley furnace, with a freight rate of 90c. a ton for delivery in the Pittsburgh or Cleveland districts.

Billets and Sheet Bars.—A Youngstown interest reports that it has sold about 155,000 tons of open-hearth billets and sheet bars for delivery up to the end of the year, the billets at $26.50 and the sheet bars at $27.50, maker's mill. The National Tube Company has placed an order for about 2000 tons of slabs for delivery at one of its local mills. A sale is reported of 200 tons of open-hearth billets for prompt delivery at about $28, being a premium of $1.50 a ton over what is regarded as the regular market. The scarcity in supply of steel is easing up somewhat, but the pressure against the mills for deliveries is still strong. We quote Bessemer and open-hearth billets for prompt and third quarter delivery at $26.50 to $27 and Bessemer and open-hearth sheet bars for same deliveries at $27 to $27.50, maker's mill, Pittsburgh or Youngstown. We quote forging billets at $34 to $35 and axle billets $29 to $30.

Ferroalloys.—As yet the reduction of $2.50 a ton in the official price of 80 per cent. English ferromanganese, or from $61 to $58.50, has not resulted in any important business. In fact, prior to the reduction in price, 80 per cent. ferromanganese was being offered at $58, seaboard, and the market is none too strong at that figure. Consumers are pretty well covered for the remainder of the year and only an occasional carload lot is being sold, which brings $58 to $58.50, seaboard. We quote 80 per cent. ferromanganese for prompt shipment at $58 to $59, Baltimore. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh.

Wire Rods.—Consumers are specifying at a fair rate against contracts, but there is practically no new demand. We quote Bessemer, open-hearth and chain rods at $28.50 to $29, Pittsburgh.

Muck Bars.—There is a scarcity of muck bar, several large plants having been closed since June 30. Among these are the Girard, Ohio, plant of the A. M. Byers Company and the Youngstown, Ohio, plant of the Youngstown Sheet & Tube Company. Both have so far refused to sign the Sons of Vulcan scale, which calls for a flat rate of $7 a ton for puddling. We quote best grades of muck bar, made from all pig iron, at $31, Pittsburgh.

Skelp.—The new demand continues active, the mills rolling skelp having work for two or three months ahead, and are somewhat back in deliveries. Pipe mills that buy skelp in the open market are specifying freely, and a sale is reported of about 1500 tons of wide sheared iron skelp at about 1.75c., Pittsburgh. We quote: Grooved steel skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.70c. to 1.75c.; sheared iron skelp, 1.75c. to 1.80c.; all delivered to buyers' mills in the Pittsburgh district.

Steel Rails.—Despite reports to the contrary, the order of the Southern Railway for 28,000 tons of rails has not been placed. This road is getting bids on 50,000 to 55,000 rail joints. Small orders for standard sections aggregate a fair tonnage. The new demand for light rails is better, the Carnegie Steel Company having received new orders and specifications in the past week for over 3000 tons. There is a very active demand for splice bars, and considerable business is in sight. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—For the two colliers, the Kanawha and Maumee, to be built by the Government, the Worth Brothers Company, Coatesville, Pa., took close to 6000 tons of plates, the Jones & Laughlin Steel Company 1500 tons of shapes, and the Carnegie Steel Company 413 tons of shapes, including the bulb angles. There are no new orders for steel cars and no inquiries out. The larger plate mills are pretty well filled to October or further, but some of the smaller mills have only three or four weeks' work ahead, and will take orders for prompt shipment. We quote 4¼ in. and heavier plate at 1.50c. to 1.60c. for delivery in three to four weeks, while for forward delivery 1.45c. is being firmly held.

Structural Material.—New inquiry is quite large, and a good deal of business is in sight. The McClintic-Marshall Construction Company has taken 1625 tons for new shops for the Big Four Railroad at Linndale, Ohio, and Beech Grove, Ind., and 400 tons for additions to the Boggs & Buhl department store, Pittsburgh. The Jones & Laughlin Steel Company has taken 600 tons for additions being made by the Kokomo Steel & Wire Company at Kokomo, Ind., and is rolling 1500 tons of steel for new buildings for the same plant placed about a month ago. The Riter-Conley Mfg. Company has taken 2150 tons of bridge work for the Pennsylvania Lines West at Chicago, and a mixer building for the Maryland Steel Company at Sparrows Point, Md., 250 tons. Reports are that low prices are still being made on most of the new work being placed. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. Small lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Iron and Steel Bars.—The new demand for steel bars continues fair, and mills report that specifications against contracts represent 75 to 80 per cent. of output. Shipments by the mills are probably heavier than ever before and they are catching up on back contracts, but have still 60 to 90 days' work ahead on actual orders. Two leading mills have contracts that will take their output up to November. The market seems firm, and it is claimed there is no shading. The new demand for iron bars is only fair, and the mills are able to make better deliveries than for some time. The mills that roll iron bars and sign the Sons of Vulcan scale have so far refused to pay the rate of $7 a ton asked by that organization for puddling. If this condition continues there may be a scarcity of iron bars before long in the Central West, as some leading puddling plants are shut down. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.65c. to 1.70c. for delivery in six to eight weeks. The mills continue to charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in.

Sheets.—There is not enough new business being placed in black or galvanized sheets to test the market. In the last two months of 1912 and in January and February of this year consumers placed heavy orders for shipment in second quarter and some as far ahead as third quarter. This explains to some extent the absence of new demand at present. Shipments by the mills are heavier than ever before, and they are gradually catch-

ing up on back deliveries. One leading maker reports a sale of a round tonnage of blue annealed sheets for delivery through the third quarter at the full price of 1.75c. for Nos. 9 and 10 gauge at mill. The supply of steel is better and this week the American Sheet & Tin Plate Company is operaing to 79 per cent. of its hot sheet mill capacity. This company is turning out a large tonnage of blue annealed sheets from its Gary, Ind., works for its Western trade. Specifications against contracts on black and galvanized sheets are quiet, but on blue annealed and electrical sheets are fairly heavy. We quote No. 10 blue annealed sheets at 1.75c.; No. 28 Bessemer black sheets, 2.25c. to 2.35c.; No. 28 galvanized at 3.35c. to 3.50c., and Nos. 28 tin mill black plate 2.25c. to 2.30c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications against contracts continue quiet and there is practically no new demand. The shut-down of 24 mills at the Aliquippa plant of the Jones & Laughlin Steel Company and the fact that the Pope works of the Phillips Sheet & Tin Plate Company at Steubenville, Ohio, is only running partially full have tended to create a slight scarcity in some sizes of tin plate for which specifications have been fairly heavy. Tin plate mills report the supply of steel as better than at any time for some months, and there is no further delay in operations on this account. The American Sheet & Tin Plate Company is operating this week to 83 per cent. of its hot tin mill capacity, the largest rate of operation in some months. There is not enough new business to test the market, but it is reported fairly firm. We quote 100-lb. cokes nominally at $3.60 and 100-lb. ternes at $3.45, f.o.b. Pittsburgh.

Bolts and Rivets.—Makers report that the new demand is quiet, being mostly for small lots, and specifications against contracts are only fair. Consumers are now able to get deliveries more promptly than for a long time, as the makers of both bolts and rivets have pretty well caught up on back orders. We quote button-head structural rivets at $2 and cone-head boiler rivets at $2.10 in large lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on bolts, which are not firmly held, are as follows, in lots of 300 lb. or over delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70 and 2½% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7½% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.F.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than 9/16	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts, ⅝ and larger	85% off
Semi-finished hex. nuts smaller than 9/16	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off
Standard cap screws	75, 10, 10 and 7½% off
Standard set screws	75, 10, 10 and 7½% off

Spikes.—The only order of any size placed lately was for 1500 kegs by the Virginian Railroad with the Republic Iron & Steel Company, to be made at its Brown-Bonnell works at Youngstown, Ohio. Specifications are quiet, and prices on railroad and small spikes are weak. We quote railroad spikes in base sizes, 5½x9/16 in., at $1.70 to $1.75, and small railroad and boat spikes in carload and larger lots at $1.80 to $1.85 per 100 lb., f.o.b. Pittsburgh.

Shafting.—The new demand is mostly for small lots, while specifications against contracts are not satisfactory. Some consumers that have not covered ahead are buying from hand to mouth, as the market is weak. We quote cold rolled shafting at 60 per cent. off in carload and larger lots and 55 per cent. in small lots delivered in base territory. On desirable orders, 61 and 62 off are being done in some cases.

Hoops and Bands.—Prices on hoops are weaker, and the demand is quiet. Not much new business is being placed in bands, as consumers are covered for some time ahead, and specifications are fair. We quote hoops at 1.60c., but on a very desirable order 1.50c. could be done. We quote bands at 1.40c. extras as per the steel bar card.

Cotton Ties.—The report that a price of 85c. a bundle f.o.b., Pittsburgh, had been fixed on cotton ties is not verified. Reports are also current that cotton ties were being offered delivered at Texas points at $1.04 per bundle, but local mills and the Sharon concern deny having quoted this price. An estimate gives the cotton crop this year as 14,000,000 bales, which will require 2,800,000 bundles of cotton ties.

Wire Products.—The new demand continues quiet, and specifications are only fair. Jobbers and retailers are specifying for only such quantities of nails as are needed to meet current wants, and none of the mills is running full. The price of wire nails by the leading interest remains at $1.80 and annealed wire $1.60, but wire nails are being freely offered at $1.70 and annealed wire can be had at $1.50 to $1.55. Prices on wire are slightly firmer than on nails. We quote cut nails at $1.65; galvanized barb wire, $2.10 to $2.20 per 100 lb. and painted $1.70 to $1.80 f.o.b., Pittsburgh, usual terms, freight added to point of delivery. Jobbers charge the usual advances over these prices for small lots from store.

Merchant Steel.—Mills report the new demand mostly for small lots, while specifications are duller than for some time. Jobbers are taking in only such quantities as are needed to meet current wants, and prices are weaker. We quote: Iron finished tire, 1½ x ½ in. and larger, 1.40c., base; under 1½ x ½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth, finish, 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Old Material.—The better feeling in the scrap trade referred to in last week's report continues. While no heavy sales have been made, considerable scrap is under negotiation. Consumers have been drawing on their stocks pretty heavily for the last three or four months, and are now in better position to take in material than for some time. The embargo on scrap routed to the Jones & Laughlin Steel Company, Pittsburgh, has been lifted, and this has helped the situation. As soon as the new open-hearth plant of the Pittsburgh Crucible Steel Company at Midland, Pa., starts, it will be a heavy buyer of scrap. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$13.00 to	$13.50
Ordinary steel scrap		12.50
†Compressed side and end sheet scrap		10.50
No. 1 foundry cast	12.75 to	13.00
No. 2 foundry cast	11.50 to	11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to	8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to	14.75
No. 1 railroad malleable stock	11.50 to	11.75
Grate bars	8.25 to	8.50
Low phosphorus melting stock	16.00 to	16.25
Iron car axles	24.50 to	25.00
Steel car axles	17.50 to	17.75
Locomotive axles, steel	21.00 to	21.50
Locomotive axles, iron	25.50 to	26.00
No. 1 busheling scrap	12.00 to	12.25
No. 2 busheling scrap	7.50 to	7.75
Old carwheels	13.75 to	14.00
*Machine shop turnings	6.50 to	6.75
*Cast-iron borings	8.25 to	8.50
†Sheet bar crop ends	14.00 to	14.25
Old iron rails	14.50 to	14.75
No. 1 railroad wrought scrap	13.75 to	14.00
Heavy steel axle turnings	9.00 to	9.25
Stove plate	8.25 to	8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Standard Pipe.—The new demand for lap weld pipe continues heavy, and several mills have been buying from each other to help out on deliveries on certain sizes. All the mills are well filled on lap weld for the next 60 to 90 days, but on butt weld sizes can make deliveries in two to four weeks. Consumers are pressing for deliveries as they desire to lay as much pipe as possible in the next three months; or before cold weather starts. Discounts on both iron and steel pipe are still being slightly shaded, but mills state the cutting is not any greater than usually prevails.

Boiler Tubes.—The new demand for locomotive tubes is heavy, and consumers are specifying freely against contracts. One mill reports actual orders on its books for the next 12 weeks and another for 14 weeks. The demand for seamless tubing is also active, and mills are pretty well sold up through October or further. Discounts on iron and steel tubes are quite firmly held.

Coke.—The makers of coke continue to stand firm on their price of $2.50 on standard grades of furnace coke for July delivery, and sales in the past week are reported as 20,000 to 30,000 tons at this figure. The appointment of a receiver for the Isabella-Connellsville Coke Company, which has 260 ovens, is not expected to affect the local situation. Furnaces whose contracts expired June 30 are buying coke from day to day, feeling that the price of $2.50 cannot be maintained for any considerable length of time. The new demand for foundry coke is fairly active, and prices are firm. To keep down the output, operators have blown out a good many ovens, and the production of coke reported by the Connellsville Courier for the week ended July 5 was but 333,358 net tons, a decrease over the previous week of 76,600 tons. Labor conditions in the coke regions are bad, the men being paid high wages and in hot weather will work only three or four days a week. We quote standard makes of furnace coke for July shipment at $2.50 per net ton at oven, but some grades of coke not as high in quality can be obtained at $2.25 or less. Standard makes of 72-hr. foundry coke are firm at $2.75 to $2.85 for prompt delivery and about $3 on contracts for last half of the year.

Chicago

CHICAGO, ILL., July 16, 1913—(*By Telegraph*).

The market developments of the past week brought out very little to give more definite indication of the trend of business. Steel specifications are reported a little heavier, particularly for bars, and it is to be noted that consumers, especially the railroads, continue to press urgently for the delivery of materials on orders. New business was insufficient to encourage hope of immediate improvement in this respect. The largest mills still have on their books structural, plate and bar orders sufficient to carry them through for several months, but delivery conditions are so much easier that where the smaller mills are seeking new business even the larger mills are making an effort to take care of all that develops, even for early shipment. Prices on the leading lines show no new tendencies to weakness except in sheets, quotations for which have been irregular for some time on mill business and are decidedly top heavy on business out of store. In some of the lesser products evidences of weakness are occasionally appearing. Active selling of pig iron in this market continued throughout the week, although individual tonnages did not reach the large figures of the business previously closed. A considerable volume of inquiry which appeared after it became apparent that a buying movement was under way and prices might react is now the basis for pending transactions. For Southern iron quotations appear to be firmly on the basis of $10.50, Birmingham, while for Northern $15, f.o.b. furnace, is more generally asked. The slight improvement manifested in buying of scrap by melters has been insufficient to relieve the general dullness of that market.

Pig Iron.—The period of active buying of pig iron in this market is still running. Purchases have been more liberal than the earlier buying forecasted and large tonnages have been arranged for quietly. Additional inquiry is appearing very generally, and pending transactions covering individual lots of various grades of iron up to 12,000 tons easily total 40,000 tons in the aggregate. Of special interest among the new inquiries is that of the Alton Steel Company whose first requirements for the new plant include 4000 tons of basic and 1500 tons of Bessemer iron. Foundry, basic and malleable irons are equally in demand, with Southern irons still handicapped on business in the Northern part of this territory by the willingness on the part of the Northern furnaces to sell corresponding grades on the Southern basis or a little better. Charcoal iron is selling freely, the furnaces making prices sufficiently attractive. The large stocks of charcoal iron held by some of the Michigan furnaces are a strong influence for aggressive selling whenever the market will absorb the iron. With reference to the general run of business, the Northern furnace position is undoubtedly less yielding in the matter of price, which does not mean that some of the desirable tonnage still to be placed will fail to bring out correspondingly favorable quotations. The general market quotations for No. 2 foundry are now $15 f.o.b. furnace for Northern iron and $10.50, Birmingham, for Southern. Buyers who have not yet closed are showing no great haste to cover, apparently anticipating no sharp advances and declining to trade except on the basis of the minimum market quotations. Seldom, however, has any buying movement been more general. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$15.75 to $16.75
Northern coke foundry, No. 1	15.25 to 15.75
Northern coke foundry, No. 2	14.75 to 15.25
Northern coke foundry, No. 3	14.25 to 14.75
Southern coke, No. 1 foundry and No. 1 soft	14.85 to 15.35
Southern coke, No. 2 foundry and No. 2 soft	14.35 to 14.85
Southern coke, No. 3	13.85 to 14.35
Southern coke, No. 4	13.35 to 13.85
Southern gray forge	13.35 to 13.85
Southern mottled	13.35 to 13.85
Malleable Bessemer	14.50 to 15.00
Standard Bessemer	18.40
Basic	14.50 to 15.00
Jackson Co. and Kentucky silvery, 6 per cent	20.40
Jackson Co. and Kentucky silvery, 8 per cent	21.40
Jackson Co. and Kentucky silvery, 10 per cent	22.40

(By Mail)

Rails and Track Supplies.—Activity in railroad supplies in this market consists of specifications against contracts already placed, the railroads making a persistent effort to secure prompter deliveries. Inquiries for rails continue to be confined to 1913 wants and are quite scattered. Considerable business is reported in light rails and a number of miscellaneous orders for standard and traction rails are noted. The Southern Railroad is in the market for 60,000 to 70,000 angle bars for use in connection with the rails for which inquiry has been made. We have reduced our quotation for tie plates, and spikes are reported weak. We quote standard railroad spikes at 1.75c. to 1.80c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $34, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—No new demand of interest is to be noted in structural materials, though the principal interests are well taken care of, with contracts covering the bulk of their output for the remainder of the last half. Deliveries show an improvement and new business is not unwelcome. The award of 3000 tons of structural material for the May building in Cleveland, on which were first specified Bethlehem shapes, has been transferred to the American Bridge Company from the Noelke-Richards Iron Works. The Chicago Steel Products Company has secured the contract to furnish approximately 4000 tons of steel for the Michigan Boulevard building, Jarvis Hunt, architect. The George A. Fuller Construction Company is general contractor for the work. Other awards in this territory include 122 tons to Decatur Bridge Company for the Big Vermillion bridge in La Salle County, Ill., Schlachter & Johnson, contractors; 124 tons to the American Bridge Company for door fittings for Duluth, Missabe & Northern Railway Company, ore dock, No. 5, Duluth, Minn., and 400 tons for the First Congregational Church of San Francisco, to the Ralston Iron Works. We quote for Chicago delivery, mill shipment, 1.63c.

The activity of demand for structural shapes out of store is contributing to a surprisingly large tonnage out of store as compared with the dullness in direct mill ordering. We quote for Chicago delivery, from store, 1.95c.

Plates.—Aside from the orders placed by the Chicago & Eastern Illinois and Indiana Harbor Belt Line for locomotives, 12 in all, and some miscellaneous buying of cars, there is little demand for railroad equipment. For general industrial work very few orders are being placed. Deliveries by mill are much easier and some of the smaller companies are becoming quite aggressive in seeking new business. For Chicago delivery from mill we quote 1.63c.

Demand for plates out of store is very light. We quote for Chicago delivery from jobbers' stocks 2.05c.

Bars.—The interest shown by implement manufacturers in the past few weeks in their steel bar requirements has resulted in a general clearing up of outstanding contracts of this character, though a number of miscellaneous orders are still pending. Latterly there has been little attempt to get concessions from 1.40c., Pittsburgh, and this price has been adhered to uniformly. New orders for bar iron are very scarce and the appearance of desirable tonnage would undoubtedly bring out concessions from some of the mills which are more eager for business. We quote for mill shipment as follows: Bar iron, 1.50c. to 1.55c.; soft steel bars, 1.58c.; hard steel bars, 1.60c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

Orders for shafting out of store are restricted almost entirely to routine business. Bar products on the contrary indicate a steady and heavy demand. For delivery from store, we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base with 5c. extra for twisting in sizes ⅜ in. and over, and usual card extras for smaller sizes; shafting 53 per cent. off.

Sheets.—Sheet mills with but few exceptions are beginning to seek specifications with some vigor Price concessions in keeping with this condition continue to rule and the more desirable tonnage is placed on the basis of 3.25c Pittsburgh for No. 28 galvanized and ordinary tonnage moving freely at prices $1 a ton higher. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.48c. to 2.53c.; No. 28 galvanized, 3.43c. to 3.58c.; No. 10 blue annealed, 1.93c.

Shipments of sheets from store have held up at better than the general rate of activity. Indications are that many buyers are filling in their immediate needs from store, meanwhile delaying the placing of mill contracts to cover their future requirements. Nominally store prices are as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Rivets and Bolts.—The few transactions covering rivets and bolts to be noted in this market present little that has new significance. Prices are weak and irregular. We quote from mill as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 75-10-2½; cut thread, 75-7½; larger sizes, 70-7½; machine bolts up to ⅜ x 4 in., rolled thread, 75-10-7½; cut thread, 75-10-2½; large size, 70-10; coach screws, 80-12½; hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.08c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅝ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ⅜ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

Old Material.—Considerable buying of rolling mill scrap and the absence of country iron served to strengthen to a slight extent the market on these grades in the past week. Little business is being done, the opinion prevailing that the present basis is too low to bring out any considerable amount of material. A decline in railroad and agricultural malleable is noted, with few transactions on the part of dealers for the purpose of covering short sales. Foundry scrap is somewhat firmer. Railroad offerings include a large list by the Baltimore & Ohio closed in the week and also a small list from the Wabash Railroad, while the Chicago, St. Paul, Minneapolis & Omaha has issued a list of 512 tons, of which 222 tons is steel rails. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.25 to 12.50
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	13.00 to 13.50
Heavy melting steel scrap	10.50 to 10.75
Frogs, switches and guards, cut apart	10.50 to 10.75
Shoveling steel	10.00 to 10.25
Steel axle turnings	7.25 to 7.75
Per Net Ton.	
Iron angles and splice bars	$13.25 to $13.75
Iron arch bars and transoms	13.50 to 14.00
Steel angle bars	10.00 to 10.25
Iron car axles	19.25 to 19.75
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	10.50 to 10.75
No. 2 railroad wrought	9.75 to 10.00
Cut forge	9.75 to 10.00
Steel knuckles and couplers	10.00 to 10.25
Steel springs	10.50 to 11.00
Locomotive tires, smooth	11.50 to 12.00
Machine shop turnings	4.75 to 5.25
Cast and mixed borings	4.75 to 5.25
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.50 to 7.00
No. 1 boilers, cut to sheets and rings	7.25 to 7.75
Boiler punchings	11.75 to 12.25
No. 1 cast scrap	10.75 to 11.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.50 to 11.00
Agricultural malleable	9.25 to 9.75
Pipes and flues	7.25 to 7.75

Wire Products.—Jobbers' stocks have apparently been reduced to a low level and will doubtless remain in this condition until some definite demand upon the part of retailers and more settled market conditions warrant the placing of contracts. The market continues weak. The quoted price of $1.80, Pittsburgh, for wire nails is reported to be maintained by the leading interest in this territory, though other makers are reported as shading 5c. to 10c. per keg. Other wire products are similarly affected and shading of $1 to $2 per ton is reported. Our quotations, which are on business with jobbers, are nominal, sales being at $1 to $2 a ton less: Plain wire, No. 9 and coarser, base, $1.78; wire nails, $1.98; painted barb wire, $1.98; galvanized, $2.38; polished staples, $1.98; galvanized, $2.33, all Chicago.

Cast Iron Pipe.—The contract for 2100 tons of pipe for the city of Cincinnati, Ohio, mentioned last week, has been finally awarded to the United States Cast Iron Pipe & Foundry Company. The American Cast Iron Pipe Company was awarded contract for 300 tons for Monroe City, Mo., and Fergus Falls, Minn., is about to buy 300 tons. We quote as follows per net ton, Chicago: Water pipe, 4-in., $28; 6 to 12-in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

The Alabama Company, with furnaces at Ironaton, Ala., has appointed Hickman, Williams & Co. exclusive agents for the sale of Clifton iron in the Chicago territory.

Philadelphia

PHILADELPHIA, PA., July 15, 1913.

Negotiations involving any considerable quantity of pig iron move slowly, usually being dependent on price conditions, involving, in foundry grades, sharp competition from Southern producers. New low prices have been attained by recent sales in both foundry and steel making grades. In finished material lines buying continues comparatively light, new orders ranging from 50 to 75 per cent. of current shipments. Mills, however, have considerable business on their books and are not immediately concerned with the smaller demand. Mill operations continue close to normal. Urgency for delivery against orders is still pronounced. The demand for crude steel shows some betterment, moderate inquiries for forward delivery coming out. Steel bars are comparatively firm, but iron bars are weaker. The coke market is decidedly firm, with higher asking prices for prompt furnace grades. Old material continues dull, with further weakness in some grades on small sales.

Iron Ore.—Consumers show no interest in the market, awaiting developments in connection with the situation as to pig iron and coke. Importations during the week include 11,372 tons from Sweden, 4700 tons from New Brunswick, 6170 tons from Nova Scotia, 5105 tons from Spain and 11,200 tons from Cuba.

Ferro Alloys.—The new basis of $58.50, seaboard, for 80 per cent. ferromanganese has brought out a little more business for forward as well as prompt shipment. Reports of concessions for prompt shipment continue to be heard. In instances $56, ex duty, is being quoted by some sellers, thus permitting buyers to take the chances on ferromanganese being placed on the free list. Very little business has come out in ferrosilicon.

Pig Iron.—Several of the large negotiations recently pending have been closed. In other cases full purchases have not yet been concluded. Sharp competition, together with weakening prices, accounts for a large part of the hesitancy of buyers to close purchases. Lower price levels have been reached and some of the eastern Pennsylvania producers state that current quotations are as low as they will go. Southern iron is a strong factor to be reckoned with when any large tonnage is involved, and several large sales of such iron have been made to consumers who usually purchase from producers in this district. The Baldwin Locomotive Works is credited with having purchased 2000 tons of Southern iron at a price under $10.75, Birmingham, for No. 2 X, while a Delaware River pipe founder has purchased several thousand tons at $10.50 for No. 3 and $10 for gray forge, Birmingham, and is still negotiating for several thousand tons, which will probably go to a producer in this district. In the recent purchases by Virginia pipe makers, Southern iron figured extensively, although Virginia producers sold several thousand tons. A fair volume of business is moving in standard brands of eastern Pennsylvania foundry irons. This is mostly made up of small lots for early delivery, which aggregate a good tonnage. Competition for even this small trade is keen and business has been taken down to $15.50 delivered for No. 2 X foundry, although some few orders have been placed at $16. A radiator manufacturer up the state has closed for several thousand tons, most of the business going to central Pennsylvania furnaces. Few large lots in the higher foundry grades are now before the trade, although two 1000-ton lots in the Baltimore district are being figured on. Virginia foundry iron has not been active; current quotations at $13.50 furnace for No. 2 X, equal to $16.30 minimum delivered in this district, being out of line with prices of both Southern and eastern Pennsylvania irons and would probably be shaded if an inquiry worth while came out. Rolling mill forge is in more active demand. An inquiry for upward of 5000 tons and another for

1000 tons are noted and another large buyer is showing interest. This grade has been nominally quoted for several weeks, but pending negotiations are expected to bring out a new low level. An eastern Pennsylvania steel maker has been quietly negotiating for basic iron for several weeks and has purchased, in the aggregate, some 8000 tons for delivery during the next few months, at prices ranging from $15 to $15.25 delivered. A recent inquirer in the Harrisburg district for 5000 tons of third quarter basic has not yet closed. Low phosphorus pig iron has been quiet, with prices unchanged. Quotations continue irregular, the following range about representing the market for standard brands, for early delivery in buyers' yards in this vicinity:

Eastern Pennsylvania No. 2 X foundry	$15.50 to $16.00
Eastern Pennsylvania No. 2 plain	15.25 to 15.50
Virginia No. 2 X foundry	16.30 to 16.75
Virginia No. 2 plain	16.05 to 16.50
Gray forge	15.00
Basic	15.00 to 15.25
Standard low phosphorus	23.50

Billets.—A somewhat better demand for both rolling and forging steel has developed and makers are inclined to hold prices more firmly, especially on small lots, although slight concessions could probably be had on round tonnages. One inquiry for 3,000 tons of rolling billets for New England and another for 1500 tons for nearby delivery are before the trade. A good volume of current small business is coming out, for which class of orders buyers usually urge makers for prompt shipment. Prices of basic open-hearth billets for rolling purposes are comparatively well maintained at $28 delivered in this district on ordinary business. Forging billets are firm at $34 minimum, Eastern mill, for ordinary analysis specifications.

Plates.—The volume of new business coming to the mills has been somewhat lighter and confined principally to small orders for a miscellaneous class of plates. No large new inquiries have come out. Eastern mills have entered contracts involving, in instances, 3000 tons for second half shipment at 1.65c delivered in this vicinity. New business in boat plates develops slowly. Inquiries for plates for several small gas holders are out but there is not much large tonnage in immediate sight. Western plates are available at 1.60c delivered here, while on current business Eastern mills maintain 1.65c here.

Structural Material.—New business consists almost entirely of small miscellaneous lots. Mill operations are about on a normal basis, but rolling schedules are not in the most satisfactory shape. Several large railroad bridge contracts are still being held up. Immediate prospects in building projects are not promising. While prices are maintained at 1.60c for current business, delivered in this district, it is estimated that sharp competition, should any desirable contract come out, might develop lower prices.

Sheets.—Mill order books in this district are in better shape, orders and specifications received last week being considerably in excess of shipments. The bulk of the orders are small, but the demand has been well maintained and makers take a more cheerful view of the situation. Mills are still being urged for prompt deliveries. Prices appear well maintained. Western No. 10 blue annealed sheets are quoted at 1.90c. here, while Eastern mills occasionally obtain a slight advance for spot deliveries.

Bars.—Consumers have been inquiring a trifle more freely, and competition for the business has brought out lower prices for iron bars. Mills seeking business have taken moderate orders for ordinary iron bars down to 1.35c., at mill. Specifications against contracts have been more liberal. For delivery in this district ordinary iron bars are quoted at 1.42½c. to 1.47½c., with better grades ranging up to 1.52½c. here. A fair business is moving in steel bars at 1.55c., delivered here.

Coke.—Prices on both furnace and foundry grades are decidedly firmer. For contract furnace coke $2.50, at oven, is firmly maintained, while $2.60 and $2.70 have been quoted for prompt furnace grades. Certain low quotations recently named for foundry coke have been withdrawn and $3. at oven, appears to be the minimum for standard brands. A comparatively small volume of business is moving. The following range of prices, per net ton, is named for delivery in buyers' yards in this vicinity:

Connellsville furnace coke	$4.05 to $4.50
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	3.75 to 4.10
Mountain foundry coke	4.50 to 5.00

Old Material.—The market continues dull and irregular. Very little business is moving in heavy melting steel, but certain interests endeavor to maintain prices of No. 1 steel at $11.25 to $11.50, delivered. Mills make meager purchases. Rolling mill grades are inactive and the few sales that are made usually go at concessions. Turnings and borings are uncalled for, and some makers are stocking them rather than sell at current prices. Stove plate, while not in strong demand, is in small supply. Low phosphorus scrap is weak, foundries being well supplied. Quotations are largely nominal. An approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$11.25 to $11.50
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap (nominal)	14.50 to 15.00
Old steel axles (nominal)	17.50 to 18.00
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	13.75 to 14.25
Wrought-iron pipe	11.00 to 11.50
No. 1 forge fire	9.50 to 10.00
No. 2 light iron (nominal)	6.00
No. 2 cut busheling (nominal)	8.00
Wrought turnings	7.75 to 8.00
Cast borings	7.75 to 8.00
Machinery cast	13.00
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	11.50 to 12.00

Robert C. Lea & Co., 426 Stephen Girard Building, Philadelphia, Pa., announce that John C. Cosgrove has become a member of the firm, and that from July 15, 1913, they will conduct a general business for the sale of coal and coke, acting as sole agents for the sale of the Hastings Coal & Coke Company's furnace and foundry coke and smithing coal, and will continue as sole agents for the sale of Robesonia low phosphorous pig iron.

Cleveland

CLEVELAND, OHIO, June 15, 1913.

Iron Ore.—Heavy rains late last week delayed work at some of the open pit mines and unloading at the upper lake docks; as a result there has not been enough ore for the contract boats and many have been compelled to wait for cargoes. The movement started out better this week. However, with the delays that have occurred so far this month, weather conditions must be favorable during the remainder of July to make possible the expected movement of 8,000,000 to 9,000,000 tons. We quote ore prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—A moderate volume of business in foundry grades is coming out in contracts for the last half. While most Valley furnaces are adhering to $14 at furnace for No. 2, the market is not firm and one or two producers are reported to be shading this price to $13.75. In Cleveland the market price has been well maintained at $14.75, delivered, for No. 2 for several weeks, but quotations of $14.50, delivered, are now being made. The Standard Sanitary Mfg. Company is in the market for 4000 tons of No. 2, 250 tons of No. 3 and 250 tons of gray forge for August and September shipment for its Pennsylvania plants. A northern Ohio manufacturer has an inquiry out for 750 tons of No. 2 for the last half. There is a fair demand for Southern grades. Sales of Southern iron reported include a 600-ton lot, a 500-ton lot and another lot of about 1000 tons for the last half and 300 tons for prompt shipment, all at $10.50, Birmingham. The market is firm at that price. One Tennessee producer has advanced its price to $11, Birmingham. Foundries continue busy and the melt is heavy. For prompt shipment and last half we quote, delivered Cleveland, as follows:

Bessemer	$16.90
Basic	15.25
Northern No. 2 foundry	$14.50 to 14.75
Southern No. 2 foundry	14.85
Gray forge	14.50
Jackson County silvery, 8 per cent. silicon	20.55

Coke.—The market is not active. There is some demand for spot foundry coke from consumers not covered, but few additional contracts are being placed. Most consumers are already covered with contracts for their last half requirements. We quote standard foundry coke at $2.75 to $3 per net ton at oven for spot shipment and contracts. There is no change in the furnace coke situation, producers holding for $2.50.

Finished Iron and Steel.—The consumption by manufacturers is heavy and consumers continue to crowd the mills for deliveries. New demand, however,

is only moderate. Some last half contracts are being placed but many buyers are refusing to place orders for future requirements, believing that there is a possibility of getting lower prices later. Some good plate tonnage for tank work has come out and the demand for structural material is quite satisfactory. The steel plant of the Upson Nut Company and the rolling mill of the Lake Erie Iron Company, Cleveland, resumed operations July 14 after a two weeks' shutdown. Eastern mills are quoting plates and structural material at 1.50c., Pittsburgh, for round lots for early delivery but are offering boiler steel at 1.45c., Pittsburgh. Because of the receivership of the Noelke-Richards Iron Works, Indianapolis, the contract for the steel for the first section of the May Company Building, Cleveland, 3000 to 4000 tons, has been relet to the American Bridge Company. Bids will be received by the county commissioners of Summit County, Ohio, for a steel viaduct in Akron, requiring 700 tons. At the same time alternative bids will be taken for a reinforced concrete arch bridge. If the latter plan is decided upon about 200 tons of reinforcing bars will be required. Makers of hard steel have reduced prices $1 a ton to 1.40c., Pittsburgh, which include twisting. The demand for sheets is light and prices are irregular. On black sheets the 2.25c. price for No. 28 is being shaded in some cases. Quotations of 1.70c. and possibly lower for No. 10 blue annealed sheets are being made. The demand for wire is light and the quotation of 1.55c., Cleveland, for plain wire is being freely made. Bar iron is inactive, with prices unchanged at 1.50c. to 1.55c., Cleveland. We quote warehouse prices at 2c. for steel bars and 2.10c. for plates and structural material.

Old Material.—The market shows no improvement in demand or shipment. None of the local mills is in the market for scrap. However, some buying is expected in about two weeks. One Cleveland consumer of steel making scrap is holding back on shipments. The dealers seem more anxious to sell at prevailing prices than they were a few weeks ago. While the market is not firm, prices, which are largely nominal, are unchanged. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$13.00 to $13.50
Old iron rails	14.50 to 15.00
Steel car axles	17.00 to 17.50
Heavy melting steel	10.75 to 11.00
Old carwheels	13.00 to 13.25
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	10.00 to 10.50
Railroad malleable	11.50 to 11.75
Light bundled sheet scrap	9.00 to 9.50

Per Net Ton.

Iron car axles	$20.00 to $21.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	4.50
Steel axle turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.25
No. 1 railroad wrought	11.00 to 11.50
No. 1 cast	11.00 to 11.50
Stove plate	8.00 to 8.25
Bundled tin scrap	10.00 to 10.50

Cincinnati

CINCINNATI, OHIO, July 16, 1913—(*By Telegraph*).

Pig Iron.—Business with the local foundries is at a standstill on account of the molders' and core makers' strike. As there does not appear to be any chance for a quick settlement, shipments on contracts to local melters are held up, and in some instances contracts have been canceled. General business from outside localities is better, and, while most sales reported are made by salesmen and not upon inquiries sent out to the trade, a stiffening in prices is reported. This is attributable to both curtailed production and the high cost of coke. Prices for standard No. 2 foundry are now firm at $10.50, Birmingham, and $14.50, Ironton. Firm offers of desirable tonnages might be taken below these figures, but the quantity of resale iron on the market is now somewhat limited and the furnaces are in better position to maintain market quotations. Several sales of Southern iron are reported in Indiana, ranging from a carload to 500 tons. These were made at $10.50 for last half shipment. There were also a number of customers in central Ohio for medium sized quantities of Northern iron who closed last week. Taking everything into consideration, the market is somewhat stronger in spite of adverse labor conditions in certain sections of the Central West. Basic consumers have been holding back for some time, but practically none in this territory is covered for this year's full requirements. A little more interest is taken in malleable, but the largest inquiry out is from central Ohio for approximately 1000 tons to be shipped during the third quarter. A local firm reports the sale of 500 tons of Ohio silvery, which is quoted at $19 at furnace for 8 per cent. silicon. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$14.25 to $14.75
Southern coke, No. 2 foundry and 2 soft	13.75 to 14.25
Southern coke, No. 3 foundry	13.25 to 13.75
Southern, No. 4 foundry	12.75 to 13.25
Southern gray forge	12.25 to 12.75
Ohio silvery, 8 per cent. silicon	20.20 to 20.70
Southern Ohio coke, No. 1	16.70 to 17.20
Southern Ohio coke, No. 2	15.70 to 16.20
Southern Ohio coke, No. 3	15.45 to 15.95
Southern Ohio malleable Bessemer	15.70
Basic, Northern	15.70 to 15.95
Lake Superior charcoal	18.75 to 19.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—Furnacemen state that the present price of pig iron is very much out of line with the demands of coke producers, and existing conditions indicate that many consumers will continue the policy of purchasing for a nearby supply until some solution of the present deadlock can be found. Furnace coke is quoted in all three producing districts around $2.40 to $2.50 per net ton at oven, with the latter price generally ruling. It is reported that a few interests in the Connellsville field have advanced contract prices to $2.60. There is little demand for foundry coke in this immediate vicinity, as the closing down by the local foundries by the molders' strike, that has been anticipated for some time, caused most of the local foundrymen to cut off shipments. However, prices are firm, averaging about $3 per net ton at oven, with concessions of 10c. to 15c. a ton made in cases where the business was desirable.

Finished Material.—A slight improvement is reported from the local warehouses, and the demand for sheets is also stated to be better than for the corresponding week of last month. A resumption of building operations has brought out a considerable number of orders for reinforcing concrete rods and structural shapes. Several bridges that were destroyed during the recent floods are yet not contracted for, and bids will be asked for soon. The local warehouse quotation on steel bars is 1.95c. to 2c., with a 5c. advance per 100 lb. for structural shapes cut to lengths.

Old Material.—The market is more demoralized than for a number of years. The strike of the local molders cut off the demand from foundries, and, while the rolling mills are consuming a fair quantity of scrap, offerings are heavier than this particular branch of the trade can consume. The low price of pig iron also tends to weaken the scrap market. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$7.25 to $7.75
Old iron rails	12.25 to 12.75
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	11.25 to 11.75
Melting steel rails	9.50 to 10.00
Old carwheels	11.00 to 11.50

Per Net Ton.

No. 1 railroad wrought	$9.25 to $9.75
Cast borings	4.75 to 5.25
Steel turnings	4.75 to 5.25
No. 1 cast scrap	9.00 to 9.50
Burnt scrap	6.50 to 7.00
Old iron axles	16.75 to 17.25
Locomotive tires (smooth inside)	10.25 to 10.75
Pipes and flues	6.00 to 6.25
Malleable and steel scrap	7.50 to 8.00
Railroad tank and sheet scrap	4.75 to 5.25

Birmingham

BIRMINGHAM, ALA., July 14, 1913.

Pig Iron.—A large interest which has three active furnaces and a new and large one ready for operation has made the announcement to the trade that it has fixed $10.50 as the basis for No. 2 iron for delivery through the remainder of the year. The company making this announcement may withdraw the price as soon as it has sold sufficient at that figure. Just prior to the issuance of this statement another concern made a week's sales of 3780 tons on the $11 basis, one car of special iron going at $12, 500 tons of No. 4 at $10, 300 tons of gray forge at $10 and 200 tons of No. 2 at $11, while lots of No. 3 sold at $10.50. This latter company has booked practically its furnace capacity for the third quarter, but has some stocks to fall back upon. A small producer has recently sold 2000 tons of various grades on the $11 basis, and for high manganese and low phosphorus grades has received above $11. Its month's sales have been around 5000 to 6000 tons on

these levels. A shipment of 2500 tons has been made to Genoa on an order booked some time ago and there is more export iron to follow. A large interest has sold 3000 tons on the $11 basis. All this makes it problematical that the lead of the one company in opening its books for $10.50 for the rest of the year is to be followed. The leading interest, it is presumed, will not, and one or two others which have stuck to the $11 basis appear to have done so well that a customer will probably have to be a preferred one, offering a round tonnage, to secure $10.50 from these concerns. We quote Alabama furnace pig iron f.o.b. furnaces as follows:

No. 1 foundry and soft	$11.00 to $11.50
No. 2 foundry and soft	10.50 to 11.00
No. 3 foundry	10.00 to 10.50
No. 4 foundry	9.75 to 10.25
Gray forge	9.50 to 10.00
Charcoal	24.00 to 25.00

Cast-Iron Pipe.—No large orders are reported by the pipe concerns, but they are in receipt of a fair volume of specifications for extension and repair work. The market has not improved, owing to the continued difficulty in placing municipal bonds. Although two pipe plants will enter the Alabama field this fall, ample business for all is predicated upon an anticipated awakening of activity in municipal securities. We quote 4-in. at $22 and 6-in. and over at $20, with $1 added for gas pipe, per net ton.

Coal and Coke.—While coke is a trifle easier since the blowing out of several furnaces, prices have not sagged because coke ovens went out at the same time in several quarters, and hence there is no surplus, while foundry coke has not been affected. We continue to quote per net ton f.o.b. ovens, $3 for furnace coke and $3.50 to $4 for foundry coke. The coal mines have received additional large orders from railroads and factories, thus insuring steady operations for some time, and there has been no change in the activity that has prevailed for several months.

Old Material.—There is no improvement in old material. The sales made are largely direct from the original selling point to the consumer, without unloading at dealers' yards. Quotations are not changed, however, because of the scattering character of the business, and would be renewed upon the return of any activity. We quote per gross ton f.o.b. dealer's yard as follows:

Old iron axles (light)	$15.00 to $15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

German Trade Conditions Worse

Steel Bars Lower for Export—Trade Combinations Cannot Maintain Prices

BERLIN, July 3, 1913.

The position of the iron trade has grown worse. While the home price of steel bars is still reported as ranging between 100 and 103 marks export prices have further given way. It is said that this week 95 to 97 marks, f.o.b. Antwerp, is all that the German mills are realizing on export orders. It is explained, however, that this reduction is regarded as arising from the prospect that a bar organization will be effected which will be operative, not only for the home market, but will give special assistance to the export trade and that this is already exercising pressure on export prices.

What Trade Combinations Are Doing

The association of cold rolling mills dissolved June 30, owing to the fact that two works, hitherto members, paid no attention to the calls for meetings to renew the organization, while another concern made exorbitant allotment demands. The breakdown has already been followed by considerable price cutting. The association had been maintaining a price of 205 marks, but prices as low as 180 and even 175 marks have been reported this week. The wire rod makers are to meet tomorrow for the purpose of voting a reduction of 5 marks. The cut is expected to apply to all contracts already taken for this quarter. The situation has been discussed by the various groups of the general association of iron founders, but they decided to make no change in their prices in view of the fact that the price of pig iron is being maintained. The organization of the screw trade for the Rhenish-Westphalian district voted this week to make a slight reduction by a change of rebate, but the size of the cut was not stated. At this meeting it was said that the shops are still well employed. The Coal Syndicate has recognized the unsatisfactory conditions prevailing in the iron trade by voting to give a drawback of 1.50 marks a ton on coal used in making all-steel products for export, and the Pig Iron Syndicate will consider similar action in a few days.

Belgian Prices Cut and Works Running Slower

The news from the Belgian trade is this week considerably worse. At the end of last week a cut of 2s. to 3s. a ton on exports of nearly all classes of steel products was reported, making the new prices as follows: Basic and iron bars, 95s. to 97s.; thin plates, 116s. to 118s.; medium grades, 114s. to 116s.; heavy plates, 115s. to 117s. Yesterday a Brussels dispatch reported cuts of between 2s. and 4s. in semi-finished steel for export. Slabs are now quoted at 79s. to 81s.; billets, 76s. to 79s., according to sizes; blooms, 75s. to 77s. A dispatch of to-day reports that the Comptoir has decided to make a still further reduction in the prices of semi-finished products for the home trade. Several weeks ago it voted to cut the price 10 francs for the September quarter, and to make the reduction apply also to June business; but now the organization has voted to make the cut for this quarter 20 francs. Another dispatch of to-day says that four steel works, six rolling mills and a number of furnaces have begun to run on short time, and discussions are in progress looking toward getting general action of this kind. The amount of the restriction is not given, but at the end of last week it was reported from Brussels that a stoppage for one day each week was in contemplation. The reviews of the Belgian trade in the German press state that the competition of Germany in the foreign markets is felt to be very keen.

St. Louis

ST. LOUIS, MO., July 14, 1913.

The pig-iron buying movement seemed to gain momentum during the past week, though as yet it is still somewhat irregular because of variations in prices quoted by different furnaces. Coke continues to stiffen and finished iron and steel is in a very satisfactory state. Scrap alone is in the dumps.

Pig Iron.—Prices of Southern brands for the most part were put firmly on a basis of $11, Birmingham, the past week and some furnace representatives report their authorized quotation to be $11.50, with their principals turning down $11 when submitted as an offer. However, there has been enough $10.50 iron obtainable from one or two sources to make the situation interesting. The total sales for the week will reach an aggregate of about 10,000 tons, the greater part being for last half delivery. Included in the sales reported are one of 2000 tons, one of 1200 tons, one of 1000 tons, a few of 500 tons and quite a number ranging down to 100 tons each. Buyers generally are becoming convinced that bottom has been reached and there is a prevalent feeling that further purchases will be made, though exceptionally large transactions are likely to be held up until September. Inquiries were pretty well closed, practically nothing remaining to be cleared up. This shows the state of mind of the buyers quite clearly.

Coke.—The coke market continues to stiffen and sales here have been small and scattered. Buyers are pretty well covered at present and transactions are mostly in small lots of favored foundry brands, running as high as $3.50 per ton at oven in some instances. By-product coke has not been particularly active, but the market has been on a basis of $5 per net ton, Joliet.

Finished Iron and Steel.—The aggregate of new orders has made no gains, but is still quite satisfactory, all things considered. Shops report themselves well filled with work and expect the good aggregate of small jobs in sight to keep them busy. Bars are in good demand, showing that consumption is not lessening. Reinforcing bars, while not quite as actively sought, are still moving freely. In standard rails the only transaction of note during the week was one for 42 miles for an Arkansas road. Track fastenings are in only fair request. Light rails are being bought from hand to mouth. Agricultural and wagon interests

continue very active. Considerable tonnage is reported as being banked up in structural lines, with plans not to make purchases until about September.

Old Material.—There has been a softening tendency which has been held in check only by a growing disposition on the part of dealers to buy stock for their yards for a rise in prices. None of the local industries is in the market. The lists closing last week went at low prices and only two are out at present for future closing, one of 500 tons from the Chicago, St. Paul & Omaha and one of 23 locomotives, about 1000 tons, from the Chicago & Eastern Illinois. Relaying rails continue in sharp request, with practically none to be had here or near here. We quote dealers' prices, f.o.b. St. Louis, as follows:

	Per Gross Ton.	
Old iron rails	$11.00 to	$11.50
Old steel rails, rerolling	11.00 to	11.50
Old steel rails, less than 3 ft.	9.50 to	10.00
Relaying rails, standard section, subject to inspection	23.00 to	24.00
Old car wheels	11.00 to	11.50
Heavy melting steel scrap	9.50 to	10.00
Frogs, switches and guards cut apart	9.00 to	9.50
	Per Net Ton.	
Iron fish plates	$10.00 to	$10.50
Iron car axles	17.00 to	17.50
Steel car axles	14.50 to	15.00
Wrought arch bars and transoms	12.50 to	13.00
No. 1 railroad wrought	9.00 to	9.50
No. 2 railroad wrought	8.25 to	8.75
Railroad springs	7.50 to	8.00
Steel couplers and knuckles	7.50 to	8.00
Locomotive tires, smooth	9.50 to	10.00
No. 1 dealers' forge	6.00 to	6.50
Mixed borings	3.00 to	3.50
No. 1 busheling	7.50 to	8.00
No. 1 boilers, cut to sheets and rings	4.50 to	5.00
No. 1 cast scrap	8.00 to	8.50
Stove plate and light cast scrap	7.00 to	7.50
Railroad malleable	7.00 to	7.50
Agricultural malleable	6.00 to	6.50
Pipes and flues	5.00 to	5.50
Railroad sheet and tank scrap	4.00 to	4.50
Railroad grate bars	5.75 to	6.25
Machine shop turnings	4.50 to	5.00
Bundled sheet scrap	4.00 to	4.50

Boston

BOSTON, MASS., July 15, 1913.

Old Material.—The market is about as dull as it can be. Sales are so few as to give no real line on actual basic conditions as they affect this market. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.75 to	$9.00
Low phosphorus steel	13.50 to	14.50
Old steel axles	13.50 to	14.00
Old iron axles	21.00 to	21.50
Mixed shafting	13.00 to	13.25
No. 1 wrought and soft steel	10.50 to	10.50
Skeleton (bundled)	7.50 to	8.00
Wrought-iron pipe	8.50 to	9.00
Cotton ties (bundled)	8.50 to	9.00
No. 2 light	3.50 to	4.00
Wrought turnings	5.25 to	5.50
Cast borings	5.25 to	5.50
Machinery, cast	11.50 to	12.00
Malleable	10.00 to	10.50
Stove plate	7.75 to	8.25
Grate bars	6.75 to	7.00
Cast-iron carwheels	13.50 to	14.00

San Francisco

SAN FRANCISCO, CAL., July 8, 1913.

The distributive movement is rather above expectations, continuing on practically the same scale as for the last two months. The tonnage of structural material also is rather heavy, with considerable building in prospect, and some classes of construction work in the country are coming out in better shape. Crops are turning out better than was expected. Collections are slow, but resale prices are firmly held in all lines. Merchants, however, are buying but little, and continued absence from the market of large individual buyers is beginning to have some effect. It is practically impossible at the moment to finance new development projects, and the heavy tonnage expected from such quarters this summer is for the most part lacking.

Bars.—Little new business is coming out in soft steel bars, as merchants and manufacturers have a fair tonnage coming on old orders, and current needs are readily supplied from store. Some foreign material has also arrived lately. It is reported that the local stock of the United States Steel Products Company will be materially increased, which will enable the trade to carry comparatively small supplies. Resale business is very satisfactory. Notwithstanding the absence of large orders for reinforcing bars, a fair tonnage is taken for local building and a good aggregate of orders is coming from the country. Local mills, working mainly on twisted and corrugated bars, are keeping most of their output sold in advance, though one mill is closed for needed overhauling. Soft steel bars in small lots, from store, remain firm at 2.75c., with iron at 2.65c.

Structural Material.—Building records for the last month show a further decline, the local figure being $1,675,554, compared with $2,054,542 for June, 1912, while Los Angeles shows a drop of about $1,000,000. No contracts of particular interest have been placed locally in the last fortnight, though Dyer Bros. have fabricating orders for several of the exposition buildings which, including rods, will run to several hundred tons, and a small theater job is reported at Seattle, Wash. A few important inquiries have come out, including the Fine Arts building for the exposition, amounting to about 2000 tons, and the addition to the Mills Building. It is reported that the exposition tower, which will soon be out for figures, will take about 3000 tons. A heavy tonnage is also expected for the Hobart estate building, for which plans are about ready, and an inquiry is in immediate prospect for additions to the Metropolitan Life Insurance building. Deliveries of plain material are coming through in good shape. Local fabricators have comparatively little work on hand, as they have taken few of the larger jobs of late.

Rails.—Some figuring is being done on old inquiries, but the prospect of business from them is no better, and no new inquiries of any importance are coming out. None of the interurban lines is starting any notable extensions, and buying for ordinary requirements is limited. There is some inquiry for light rails, but the tonnage booked is small.

Sheets.—Except for galvanized, current specifications are fairly large, with an active movement of all lines in distributing channels, though orders are numerous rather than individually large. Buyers have shown considerable hesitation in placing contracts for future delivery, and are drawing on supplies in store as far as possible, the stock of galvanized being ample for current needs.

Plates.—A considerable tonnage is coming in on old contracts, but most requirements of the immediate future are covered, and new business is rather scarce. Jobbing business continues active, and tank and pipe manufacturers are well occupied for the present, but a good many expected inquiries are held up, and neither merchants nor manufacturers desire to accumulate a surplus. The Union Iron Works, this city, has a contract for another steel tank steamer, but interest in shipbuilding material is hardly as active as a few months ago.

Merchant Pipe.—Some expected line-pipe business has not materialized, but the spring tonnage of smaller sizes has been as large if not larger than for the previous year. Present business is fair, with merchants' specifications running about normal, though new orders are limited and waterworks business is very light. While there is some variation in the quotations of different manufacturers, resale prices are firmly maintained, and the movement from store is fairly large.

Cast-Iron Pipe.—Business is quiet. No municipal contracts worth mentioning have been placed lately, and public service corporations in this vicinity are temporarily out of the market. Some improvement is expected, however, in view of the number of municipal projects planned. The only new inquiry is for about 3000 tons for the city of Portland, Ore., for which bids will be taken in a few weeks.

Pig Iron.—There is practically no movement of pig iron here at present. Foundrymen report business rather quiet, and, with enough iron for actual needs either on hand or coming on old contracts, they are not disposed to buy. Local dealers, however, consider present prices low, and look for an active movement with advancing prices when the tariff changes are completed. Local quotations on No. 1 Southern foundry and soft range from $22.75 to $23.50 per gross ton.

Coke.—Supplies of foreign coke are now fairly large, with considerable due to arrive and several sailing vessels just starting for this port. Current business is

light, but prices are fairly well maintained, German Syndicate coke, ex yard, being quoted at $15 to $15.50 per net ton, and shipments for fall loading at $11.50 to $12 per gross ton.

Old Material.—Scrap of all descriptions is moving off fairly well, the demand being about as large as at any time this year. A good tonnage has been sold in the last few weeks, and supplies in local yards are gradually diminishing. Prices show a little more steadiness, quotations being as follows: Cast-iron scrap, per net ton, $17.50 to $18; steel melting scrap, per gross ton, $12; wrought scrap, per net ton, $13 to $15; rerolling rails, per net ton, $16.50.

The Brode Iron Works, San Francisco, operating a structural fabricating shop, has been incorporated with a capital stock of $20,000, by R. J., Emma and W. R. Brode.

Buffalo

BUFFALO, N. Y., July 14, 1913.

Pig Iron.—Inquiry has broadened and is more general in character than for some time. Sales also have shown an increase, aggregating probably 15,000 tons of all grades in this district for the week. Prices have reached a level where many buyers feel that it is to their interest to cover. Furnacemen, however, are not inclined to meet consumers' views on prices in some quarters, and are curtailing production, not caring to submit to the heavy loss that a continuance of the present low prices would entail. With one of the Tonawanda Iron & Steel Company's Niagara furnaces now definitely out of blast, having been blown out on Friday last, there are four merchant furnaces out of commission in this district in addition to the New York State Steel Company's furnace which has been closed for some time, pending readjustment of the company's financial obligations. This will materially reduce the production of the district and should tend to stiffen prices. Quotations remain about the same as reported last week, being as follows, f.o.b. Buffalo, for delivery through last half:

No. 1 foundry	$14.00 to $14.25
No. 2 X foundry	14.00
No. 2 plain	13.75
No. 3 foundry	13.75
Gray forge	13.75
Malleable	14.00 to 14.25
Basic	14.00 to 14.50
Charcoal	16.00 to 17.00

Finished Iron and Steel.—In bar material and most all other finished lines specifications continue in fair volume, considering that it is the dull season. There are practically no cancellations and prices of bars, plates and shapes are being firmly held. Consumption is going on at a full normal rate, and unless there is an unexpected stoppage in this respect there must of necessity be an influx of new buying of considerable proportions by early fall. Orders on mill books are claimed to represent more live tonnage than at any corresponding period in the steel business, due to the enforcement of the monthly quota clause in contracts and the writing off each month of unspecified balances, which, however, amounts to but a small percentage. Cold rolled steel moved more freely the past week than any other product, users contracting without hesitancy for their requirements, feeling that prices are as low as they will go as long as bar prices remain where they are. In wire products, particularly nails, a canvass of the market indicates that there are comparatively few contracts in existence, most old contracts having been specified in full and jobbers' stocks are being rapidly moved to consumers; consequently when the new buying movement in this line commences in the fall it will likely be of considerable magnitude. Business in black and galvanized sheets is comparatively quiet, with prices firm. In fabricated structural lines new business for the week has been light, but most fabricators are busy on existing contracts, particularly in small tonnage work, and some of them have 5 or 6 months' work on hand. Bids go in tomorrow for steel for the Elmwood Theater, Buffalo, 100 tons. Bids are being taken for the steel for the Schoellkopf memorial training house at Cornell University, Ithaca, and plans are nearly ready for figures for steel for a parochial school building for the parish of St. Mary's of the Cataract, Niagara Falls, each requiring moderate tonnages. The Lackawanna Bridge Company, Buffalo, has taken contract for the 400 tons required for the new power house for the Hewitt Rubber Company, Buffalo.

Old Material.—Only moderate transactions are reported for the week. Dealers are not seeking large tonnage business at the present low prices, believing it to be better policy to hold material for a more active demand at better prices which they confidently expect later on. Quotations, which are unchanged, are as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$11.00 to $11.50
Boiler plate, sheared	13.00 to 13.75
Bundled sheet scrap	8.50 to 9.00
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	13.00 to 13.50
Railroad malleable	12.50 to 12.75
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Wrought iron and soft steel turnings	6.00 to 6.50
Clean cast borings	6.00 to 6.50
Bundled tin scrap	16.00

British Iron Markets Still Depressed

Cleveland Iron Makers Not Unanimous in Opposing Warrant Stores—Large Sale of Southern Pig Iron

(By Cable)

LONDON, ENGLAND, July 16, 1913.

All markets are depressed by finance and politics. Pig iron remains dull. The Cleveland pig-iron makers have appointed a committee to work out the details of a scheme by which warrant stores can be displaced so as to kill the warrant market, but the iron makers are not unanimous in their support of such a scheme and merchants are actively hostile. An Alabama producer has sold 10,000 tons of basic pig iron at 60s., c.i.f., Liverpool. Further heavy sales of semifinished steel have been made by Continental works, and the tendency of this material is firmer, but finished products are weaker. Stocks of pig iron in Connal's stores are 203,806 tons, against 206,343 tons last week. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 55s. 6d., against 55s. 10d. a week ago.

No. 3 Cleveland pig iron, makers' price f.o.b. Middlesbrough, 56s., against 56s. 6d. a week ago.

Ferromanganese, £11 2s., f.o.b. shipping port, a decline of 11s. 3d.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5.

German sheet bars, f.o.b. Antwerp, 87s. 6d.

German 2-in. billets, f.o.b. Antwerp, 80s.

German basic steel bars, f.o.b. Antwerp, £4 13s., a decline of 2s.

French blooms, 77s. f.o.b. shipping port.

French sheet bars, 82s. 6d. f.o.b. shipping port.

Steel bars, export f.o.b. Clyde, £7, a decline of 10s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £6 10s., a decline of 5s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 5s.

Steel rails, export, f.o.b. works port, £6 12s. 6d., a decline of 2s. 6d.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. 1½d., a decline of 1½d.

New York

NEW YORK, July 16, 1913.

Pig Iron.—The volume of transactions is greater and the amount of business under negotiation has increased. Details of inquiries and sales that ordinarily become current are less in evidence, though the indications still are that prices have suffered. Virginia furnaces have been unable to meet the prices made from Buffalo on New England inquiries, $13.50 at furnace for No. 2X being as low as most Virginia stocks are willing to go at present costs. In New York State some low prices have been reported, indicating further concessions. At the same time some producers have been asking more for deliveries through the year than for prompt iron. For the present the blowing out of furnaces supplying the eastern trade has come to a stand, but the feeling continues that that process must

go further if prices are to take on any semblance of firmness. Producers find it difficult to interpret the state of the market in the absence of any pronounced evidence of slackening in foundry operations. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $16 to $16.25; No. 2 X, $15.50 to $15.75; No. 2 plain, $15.25 to $15.50. Southern iron is quoted at $15.75 to $16.25 for No. 1 foundry and $15.25 to $15.50 for No. 2.

Structural Material.—The striking feature of the market this week was the awarding on July 15 of two large contracts, aggregating 9400 tons, which have been before the trade for many weeks, both having been held up by conditions. These are the 3700-ton building for the Hill Publishing Company and the Hallenbeck Printing Company's building at Lafayette, Franklin and White streets, calling for 5700 tons, both awarded to the Hay Foundry & Iron Works. The decision to go on with these important undertakings has given a more cheerful aspect to the general sentiment. Other new contracts include a viaduct for the New York & Long Branch Railroad over the Navesink River at Red Bank, N. J., 1500 tons, secured by the American Bridge Company; the Levy apartments on Seventy-second street, 1000 tons, awarded to the Passaic Steel Company, and a building for the Hewitt Rubber Company, Buffalo, 240 tons, to the Lackawanna Bridge Company. Inquiries are a little more active than for some weeks. Prominent among these is the Loyola High School on Madison avenue between Eighty-fourth and Eighty-fifth streets, 1400 tons, bids for which are in. The Lehigh Valley Railroad is asking for bids on four bridges totaling 1000 tons, and the New York Central for bids on a 400-ton transfer bridge at Weehawken, as well as 200 tons of terminal work. Several apartment houses are in sight and bids are already in on one for the Woolsey Realty Company on Eighty-fifth street near West End avenue, aggregating 500 tons. Desired deliveries are made with less difficulty and prices for plain material continue at 1.45c., Pittsburgh, or 1.61c., New York. Quotations from store are still reported at 2.10c. to 2.15c.

Plates.—The recent reduction in prices for quick delivery has not brought out any large inquiries, but general business is of fair volume. Deliveries are prompt from any producer. The Pressed Steel Car Company has secured an order for 296 gondolas from the Union Railroad. The Gulf, Florida & Alabama Railroad is reported to have purchased 50 flat cars. Financial conditions are still delaying large orders from the Boston & Maine and the St. Louis & San Francisco railroads. Export demand continues good at 1.51c. to 1.56c., New York. We quote 1.50c., Pittsburgh, or 1.66c., New York, for delivery in one to two weeks, and 1.45c., Pittsburgh, or 1.61c., New York, for mill shipment in the last half. One Eastern producer quotes 1.69c., New York, for plates in less than carload lots, quick delivery.

Bars.—The situation continues in the same generally satisfactory condition reported last week. Mills are booked ahead several weeks or months on old and new contracts, especially in steel bars, and current orders and specifications have been almost equal to shipments in the case of one important producer. Quotations for steel bars remain at 1.56c., New York, and iron bars are reported at 1.45c. to 1.55c., New York, recent concessions on iron indicating that some Eastern mills are more urgent for business. Store prices are still reported at 2c. to 2.05c. for steel bars and 2.05c. to 2.10c. for iron bars.

Ferroalloys.—Following the reduction from $61 to $58.50, Baltimore, by the English makers of 80 per cent. ferromanganese, last week, merchants here went further with a reduction of $1.50, and it is reported that several hundred tons for prompt delivery were sold at $57, Baltimore. While there undoubtedly is resale ferromanganese to be had at or near the same low figure, it is practically confined to prompt delivery. Inquiry for several hundred tons is still before the trade, some for prompt and some for future delivery. Ferrosilicon, 50 per cent., is unchanged at $75, Pittsburgh, for carloads, $74 for 100 tons and $73 for 600 tons or over. Recent inquiry has been mostly for carload lots, but there is one out for 100 tons.

Cast-Iron Pipe.—The city of Schenectady, N. Y., opens new bids today on 1500 tons advertised for June 3, but on which a reletting was announced. Up to the present the Degnon Contracting Company has not purchased the 10,000 to 11,000 tons required for its contract for the extension of the New York high pressure fire prevention service. The general demand is slow. Prices of carload lots of 6 in. are $23 to $24 per net ton, tidewater, New York.

Old Material.—Dealers report the past week to have been the dullest in many years, hardly excepting the times following the panic of 1907. Steel works, rolling mills and foundries are making practically no inquiries for old material, while rejections on deliveries on contract have been increasingly numerous, indicating that consumers are not in need of stock and are discouraging shipments. Under the circumstances transactions have been so few as to shed little light on market values. Dealers' quotations, largely nominal, are as follows, per gross ton, New York:

Old girder and T rails for melting	$8.50 to	$9.00
Heavy melting steel scrap	8.50 to	9.00
Relaying rails	21.50 to	22.00
Rerolling rails (nominal)	12.00 to	12.50
Iron car axles	20.50 to	21.00
Steel car axles	14.00 to	14.50
No. 1 railroad wrought	11.25 to	11.75
Wrought iron track scrap	10.50 to	11.00
No. 1 yard wrought, long	10.00 to	10.50
No. 1 yard wrought, short	9.50 to	10.00
Light iron	4.00 to	4.50
Cast borings	5.00 to	5.25
Wrought turnings	4.25 to	4.50
Wrought pipe	8.25 to	8.75
Carwheels (nominal)	12.00 to	12.50
No. 1 heavy cast, broken up	10.25 to	10.75
Stove plate (nominal)	7.50 to	8.00
Locomotive grate bars	7.00 to	7.50
Malleable cast	8.50 to	9.00

Metal Market

NEW YORK, July 16, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
July	Lake.	Electro-lytic,	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
10	14.62½	14.37½	39.55	4.35	4.20	5.40	5.25
11	14.62½	14.37½	40.70	4.35	4.20	5.35	5.20
12	14.62½	14.25	.....	4.35	4.20	5.35	5.20
14	14.62½	14.25	39.35	4.35	4.20	5.30	5.15
15	14.50	14.12½	39.90	4.35	4.20	5.30	5.15
16	14.50	14.12½	40.00	4.35	4.20	5.30	5.15

Copper continues dull at reduced prices. Tin is inactive at quotations that have changed but little. Lead has better inquiry, but not enough to affect the market. Spelter is lower and its market listless. Antimony is lower and dull.

New York

Copper.—The one feature of interest is the reduction of the price of electrolytic by all agencies to 14.25c., 30 days, delivered, yesterday, which is equivalent to 14.12½c. cash, New York. All positions are included in this offering with the exception of spot metal which is scarce and somewhat difficult to get, although when it is found only a slight premium is asked. Quotations of outside lots have declined steadily in the last week and for no other reason than the small buying. Lake was reduced yesterday to 14.50c. and this figure is nominal also because of the lack of demand. Resale Lake copper is hard to find. Where consumers have not ample stocks of either Lake or electrolytic they are proceeding cautiously and buying only for immediate needs. There are those in the market who believe that even at the present low price no good buying will be induced and that prices are destined to go lower. In fact there has been talk that offerings still closer to 14c. than those quoted have found no takers. The price of copper in London today is £62 16s. 3d. and £63 for futures. Exports to date—the first half of the month—total 10,000 tons, which is under the normal.

Pig Tin.—On Thursday last a fair business was done, between 250 and 300 tons changing hands, the bulk of which was taken by consumers who had permitted their stocks to run low. The remainder of the sales was for speculative reasons. Since Thursday there has been very little business. The London market has been up and down repeatedly during the week and to-day is £5 higher than it was July 9. The New York price to-day is 40c. The price of spot in London to-day was £182 5s. and of futures £183. The arrivals this month total 2420 tons and there is afloat 2177 tons.

Lead.—In the last few days there has developed a better inquiry for prompt shipments, which is an indication that consumers have let their stocks run down. However much they need lead they are proceeding cautiously, and the new demand has not been sufficient to affect prices or the tone of the market. The quotation in New York is 4.35c. and in St. Louis 4.20c.

Spelter.—The recent demand involving fairly large quantities has been supplied and the market is again dull and prices have declined. The New York quotation is 5.30c. and that in St. Louis 5.15c. The dullness is credited not only to a smaller domestic demand but to a falling off in exports of galvanized products. Government statistics, which may explain the recent big slump in spelter, are expected soon and are awaited with interest.

Antimony.—This market continues dull and without features of interest beyond reductions in quotations in some brands announced to-day. Hallett's is now quoted at 7.75c. to 8c., Cookson's at 8.40c. to 8.50c. and Chinese and Hungarian grades at 7.37½c. to 7.62½c.

Old Metals.—Little business is being done. Dealers' selling prices are lower, being nominally as follows:

	Cents per lb.
Copper, heavy and crucible	13.75 to 14.00
Copper, heavy and wire	13.50 to 13.75
Copper, light and bottoms	12.50 to 12.75
Brass, heavy	8.75 to 9.00
Brass, light	7.50 to 7.75
Heavy machine composition	12.75 to 13.00
Clean brass turnings	8.50 to 8.75
Composition turnings	11.25 to 11.75
Lead, heavy	4.25
Lead, tea	4.00
Zinc, scrap	3.85

Chicago

JULY 14.—With the expectation of encouraging prospective buyers to close the leading interests have been offering copper at slightly lower prices, and buying of some magnitude is reported. Tin, by reason of its extreme fluctuations, has been perhaps the most interesting feature of the market. In other respects metal values are generally unchanged. We quote as follows: Casting copper, 14.75c.; Lake, 15c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 40.75c.; small lots, 43c.; lead, desilverized, 4.30c. to 4.35c.; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.25c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is $7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 12.50c.; copper bottoms, 11.75c.; copper clips, 12.75c.; red brass, 12c.; yellow brass, 8.50c.; lead pipe, 3.50c.; zinc, 3.75c.; pewter, No. 1, 32c.; tinfoil, 32c.; block tin pipe, 39c.

St. Louis

JULY 14.—The metal market has been somewhat irregular, showing strength in some quarters and a weakness elsewhere. Lead closed to-day at 4.20c.; spelter, at 5.20c.; tin, 39.60c. to 39.85c.; Lake copper, 14.72½c. to 14.85c.; electrolytic copper, 14.60c. to 14.75c.; Cookson's antimony, 8.90c to 9c. In the Joplin ore market there was a brisker demand for zinc ores and prices moved upward decidedly. Lead ore was unchanged. We quote miscellaneous scrap metals as follows: Light brass, 5c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 10.50c.; pewter, 21c.; tinfoil, 27c.; zinc, 2.50c.; lead, 3c.; tea lead, 2.75c.

Recent Alliance Crane Orders

The Alliance Machine Company, Alliance, Ohio, has taken a contract to furnish the following cranes to the Broken Hill Proprietary Company, for use in its new steel plant in New South Wales, Australia: One 150-ton stripper, 5-ton soaking pit crane, 100-ton ladle crane, 60-ton ladle crane, 3½-ton floor charger. All are high-class cranes and in many respects duplicates of cranes furnished by the same builder for the Gary plant of the United States Steel Corporation. The company also has an order for a similar line of cranes from the Kokomo Steel & Wire Company, Kokomo, Ind. An order was recently taken for seven cranes from the Pennsylvania Steel Company, among which are two four-girder ladle cranes of the latest type, one of which will handle 175 tons and the other 75 tons, and another from the Maryland Steel Company for an electric duplex stripper of 150 tons capacity and a high speed soaking pit crane, this being an exact duplicate of those in operation at Gary, which are claimed to be the speediest and most accessible cranes of this type.

While the Alliance Machine Company's output in the past has been practically a crane per day, when the present improvements now under way are in operation, it expects to increase its output 50 per cent.

Iron and Industrial Stocks

NEW YORK, July 16, 1913.

The tendency of the stock market has been slightly upward, due to the improved situation regarding the Southern Pacific-Union Pacific merger settlement and the better tone of the foreign market. The threatening strike of railroad trainmen has not weakened prices but has caused a severe shrinkage in stock transactions. On some days in the past week the volume of business on the New York Stock Exchange has been lower than on any day since the depression of 1896. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Am. Can, com.	26⅜- 28	Railway Spring, com.	23¼- 23½
Am. Can, pref.	86½- 88	Railway Spring, pref.	91⅞
Am. Car & Fdy., com.	41 - 41¾	Republic, com.	18½- 19¼
Am. Car & Fdy., pref.	108¾	Republic, pref.	76¼- 77
Am. Loco., com.	28½- 29½	Rumely Co., com.	14¾- 15½
Am. Loco., pref.	101	Rumely Co., pref.	36 - 36¼
Bald. Loco., pref.	103	Sloss, com.	23
Beth. Steel, com.	27⅜- 29	Pipe, com.	10 - 10¼
Beth. Steel, pref.	66¼	Pipe, pref.	47½- 48
Case (J. I.), pref.	98⅛	U. S. Steel, com.	51⅜- 53⅛
Colorado Fuel	26¾	U. S. Steel, pref.	103¾-104⅞
Deere & Co., pref.	94½	Westinghouse Elec.	57 - 57¾
General Electric	137 - 139	Am. Ship, com.	42
Gr. N. Ore Cert.	30½- 32	Chic. Pneu. Tool	49¼- 49½
Int. Harv., pref.	111⅞-112	Cambria Steel	43½- 44¼
Int. Harv., Corp.	102½	Warwick	10
Int. Pump, pref.	22½- 22⅞	Crucible Steel, com.	13¼- 13¼
Nat. En. & St., com.	11	Crucible Steel, pref.	84¼- 85⅛
Pressed Steel, com.	23	La Belle Iron, com.	46 - 47½
Pressed Steel, pref.	93		

Dividends Declared

The Emerson-Brantingham Company, regular quarterly, 1¾ per cent. on the preferred stock, payable August 1.

The Independent Pneumatic Tool Company, regular quarterly, 2½ per cent., payable July 10.

The Dominion Iron & Steel Corporation, quarterly, 1½ per cent. on the new preferred stock, payable August 1.

Lackawanna Steel Company's Half Year

The Lackawanna Steel Company has issued the following comparative statement of its income account for the half year ended June 30:

	1913	1912	Increase
Income from manufacturing and operating after deducting all expenses incident thereto, including ordinary repairs and maintenance of plants and interest on bonds and fixed charges of subsidiary companies	$3,125,952.31	$815,107.97	$2,310,844.34
Proportion of earnings on investments in companies not controlled, and of other annual income	387,516.90	385,722.65	1,794.25
Total	$3,513,469.21	$1,200,830.62	$2,312,638.59
Deduct interest on Lacka. Steel Co. bonds and debentures outstanding	874,911.83	874,983.33	71.50†
Balance	$2,638,557.38	$325,847.29	$2,312,710.09
Less charges and appropriations for the following purposes:			
Sinking funds on bonds and exhaustion of minerals	231,705.28	161,770.94	69,934.34
Depreciation and accruing renewals	651,656.57	529,302.56	122,354.01
Total deductions	$883,361.85	$691,073.50	$192,288.35
Profit for first half	$1,755,195.53	$365,226.21*	$2,120,421.74
Special profit on sale of capital assets of subsidiary companies	267,200.90	.....	267,200.90
Total profit for first half	$2,022,396.43	$365,226.21	$2,387,622.64
Unfilled orders (gross tons)	436,675	564,990	128,315†

*Deficit. †Decrease.

This statement shows a most remarkable change from conditions in the first half of 1912, when operations resulted in a deficit of $365,226.21.

The Eagle Claw Wrench Company, Chicago, whose offices have been located at 565 West Washington street, is now at 36 West Randolph street.

Personal

J. W. C. Bullard, of the Bullard Machine Tool Company, Bridgeport, Conn., is in Europe in the interest of the company. At present he is in England and later will visit the Continent.

William H. Donner, president Cambria Steel Company, Johnstown, Pa., has gone to Beaumaris, Canada, for the summer.

Frank B. Smith, who for the last two years has looked after the interests of the Bullard Machine Tool Company, Bridgeport, Conn., as its representative in Chicago, has been transferred to the Cleveland district, where he will act in conjunction with the company's agent, the Motch & Merryweather Machinery Company.

Samuel T. Greaves, formerly with the Vanadium Metals Company, Groton, Conn., has resigned to become superintendent of the foundry of the Vanadium Metals Company, Pittsburgh.

John Tod has been elected chairman of the board of directors of the Brier Hill Coke Company, a subsidiary of the Brier Hill Steel Company, Youngstown, Ohio.

C. S. Hubbard, manager of the H. M. Meyers Company plant of the Ames Shovel & Tool Company, Beaver Falls, Pa., will sail for Europe July 19, on the Imperator. He will motor through England and Scotland, returning home about the first week in September.

Ralph H. Binns, president Hussey-Binns Shovel Company, Pittsburgh, sailed for Europe July 12.

Fred Tod, in charge of sales of pig iron of the Brier Hill Steel Company, Youngstown, Ohio, has returned from a trip to Europe.

Samuel H. Church, treasurer Union Steel Casting Company, Pittsburgh, will sail for Europe July 19, on the Imperator.

James M. Woltz has been appointed safety director and G. A. Rinhardt, metallurgist, of the Youngstown Sheet & Tube Company, Youngstown, Ohio.

Andre Citroen, of Paris, France, who has been in this country for several weeks in connection with the proposed establishment of a plant here for the manufacture of helical gears, sailed for Europe July 8. He will return in the course of a few weeks.

Archibald Johnston, first vice-president Bethlehem Steel Corporation, sailed for Europe July 5.

James Morton, sales representative of several American manufacturers, has returned to New York after a five months' trip to Australia.

F. D. Johnson, general manager Consolidated Pneumatic Tool Company, London, sailed for Europe July 5.

John Neudoerfer, formerly Cincinnati sales manager of the Portsmouth Steel Company, Portsmouth, Ohio, has been transferred to Kansas City, Mo. He is succeeded by G. C. Mayer.

E. D. Findlay, assistant Western sales manager for the Pittsburgh Steel Company, with offices at Chicago, has tendered his resignation effective July 1.

J. F. Marshall, until recently purchasing agent for the Wheeling & Lake Erie Railroad, will succeed E. S. Wortham as manager of purchases and supplies for the Chicago & Alton at Chicago.

J. H. Beggs has been appointed purchasing agent for the Chicago & Eastern Illinois Railroad, coincident with the removal of the purchasing department from the Frisco system offices to Chicago.

Frank J. Whitgrove has been appointed general superintendent of the Dekalb, Ill., works of the American Steel & Wire Company. He was transferred from the Lincoln works of the same company, where he is to be succeeded by Louis Booth.

J. B. Doan, vice-president and general manager American Tool Works Company, Cincinnati, Ohio, is absent on a vacation trip to Colorado.

Dr. Carl Hering, consulting engineer, Philadelphia, has just returned from a trip to Europe. He delivered a lecture on "Pinch Phenomenon" before the Faraday Society in the Northampton Institute, London, exhibiting a small model of his electric furnace, which is designed on the "pinch-effect" principle.

G. W. Ford, Cleveland Planer Works, Cleveland, Ohio, sailed a few days ago for Europe. He will spend about two months visiting various countries.

Zenas W. Carter, secretary of the Electric Development Association, Boston, Mass., sailed for Europe July 13 on the steamer Ionian of the Allan Line, Montreal, expecting to spend about two months in England, France, Belgium and Scotland.

B. E. Hutchinson has been elected vice-president of the Blair Engineering Company, with office at 17 Battery place, New York.

G. W. Fleming, of the Vandyck Churchill Company, New York, has resigned and will become western New England representative of the Chandler & Farquhar Company, Boston, Mass., with headquarters in Hartford, Conn.

C. R. Burt, of Rockford, Ill., has been appointed factory manager of the Russell Motor Car Company, Toronto, Canada. He was for nine years with the Brown & Sharpe Mfg. Company, Providence, R. I.

A. L. Johnson, engineer of the Dominion Bridge Company, Montreal, Canada, on a recent visit to New York, reported business good.

Obituary

Bernhard Schuchardt

Bernhard Schuchardt, head of the German machine tool house of Schuchardt & Schutte, whose death on June 3 at his residence in Grunewald, near Berlin, was mentioned briefly in *The Iron Age* of June 5, was born in Cassel, Germany, November 17, 1855. In his early years after leaving college, Mr. Schuchardt went to England and traveled in other countries. In 1880 the firm of Schuchardt & Schutte was founded. From a small beginning the house developed with great rapidity into the present large enterprise. Mr. Schuchardt made his first trip to the United States in 1890. Recognizing at that time the high stage of development of the American machine tool industry, he decided to use his energies in introducing and furthering the sale of American machinery abroad. Not only was the machine tool industry benefited by his work but also important manufacturing centers all over the world, inasmuch as they were made familiar with American tools and manufacturing methods. In the course of time Mr. Schuchardt's firm opened branch houses in Austria-Hungary, Great Britain, Sweden, Norway, Denmark, Russia, North and South America, China, Japan, etc. The organization is one unlimited

BERNHARD SCHUCHARDT

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

by borders of countries or languages and could only have been built up by a commercial genius of Mr. Schuchardt's caliber.

THOMAS V. HANDLOSER died at his residence in Pittsburgh, Pa., July 3, aged 62 years. He was born at Constance in Baden, Germany, and came to the United States in 1872, locating in Trenton, N. J. He rose to become superintendent of the Buckthorn Fence Wire Company, then a subsidiary of the John A. Roebling's Sons Company. In 1885 he moved from Trenton to New York City to become superintendent of the factory of R. H. Wolff & Co., manufacturers of wire and subsequently of bicycles. In 1903 he became a resident of Pittsburgh, where he held the position of general manager of Dilworth, Porter & Co., Ltd., severing that connection January 1, of this year. His career was one of marked success in engineering, mechanical and executive lines. He was a member of the Arion Society of New York City, the German Club of Pittsburgh and the Western Society of Engineers. He leaves a widow, two sons and a daughter. One of his sons is Robert C. Handloser, local manager of the Motch & Merryweather Machinery Company, Detroit, Mich.

WILLIAM B. HUGHES, gas engineer of the Wellman-Seaver-Morgan Company, Cleveland, Ohio, died July 9, from heart trouble, age 54 years. He had been in poor health for a year or more. He was the inventor of the Hughes mechanical gas producer, which is used in many steel plants, and of other appliances relating to the manufacture and application of gas. He was born in Philadelphia, Pa. For some time he was employed by the Shaw Machine Company and for 18 years he was assistant chief engineer of the Pencoyd Iron Works. Later he designed and built the plant of the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa. Nine years ago he became associated with the Wellman-Seaver-Morgan Company. He leaves a widow, one daughter and one son.

ELMER A. SAMMONS, president and general manager of the E. A. Sammons Machinery Company, New Orleans, La., was run over July 3 by a trolley car in that city and instantly killed. He was born in Sheboygan, Wis., and was 55 years old. He began his business career as captain of a steamboat on Lake Superior at the age of 16, and for a number of years continued in that occupation. In 1892 he moved to Louisiana, becoming manager of a sugar refinery. Not long afterward he took up his residence in New Orleans and engaged in the sale of machinery. His company held the Southern agency for Wickes Brothers, Saginaw, Mich. His wife died two years ago and he leaves four daughters and two sons.

FREDERICK W. GORDON, metallurgist and mechanical engineer, died at his home at Fort Washington, near Philadelphia, Pa., July 11, aged 71 years, after a short illness. He will be particularly remembered in connection with the engineering firm of Gordon, Strobel & Laureau, once prominent in the iron trade. Mr. Gordon was at one time vice-president of the Pratt & Whitney Company, Hartford, Conn. He leaves a widow and one daughter.

WILLIAM BRUNOW, for 10 years manager of the Chicago branch of the Geuder, Paeschke & Frey Company, Milwaukee, Wis., and associated with the company in various capacities for more than 30 years, died last week after a short illness, aged 61 years.

Equalizing Pittsburgh and Wheeling Ore Freight Rates

Announcement is made that the Pennsylvania, Baltimore & Ohio and Wheeling & Lake Erie railroads will file new tariffs with the Interstate Commerce Commission making an 88c. rate on iron ore hauled from lower Lake ports to Pittsburgh and Wheeling. The recent decision of the Interstate Commerce Commission ordered the railroads to equalize the Pittsburgh and Wheeling rates. The new tariffs will lower the Pittsburgh rate 8c. per ton and will raise the Wheeling rate 28c. per ton. It is proposed that these rates shall be placed in effect August 15. Strong protests are likely to be made by both the Pittsburgh and Wheeling blast furnace interests.

Proposed Wheeling District Consolidation

For some time past officials of the La Belle Iron Works, Steubenville, Ohio, the Wheeling Steel & Iron Company, Wheeling, W. Va., and the Whitaker-Glessner Company, also of Wheeling, the latter controlling the Portsmouth Steel Company, Portsmouth, Ohio, have been holding conferences with the object of consolidating these four concerns into one company. So far only preliminary work has been done, and all printed reports as to the proposed capital and the probable officers are entirely premature. Negotiations are now on with Julian Kennedy, of Pittsburgh, for the appraisal of the properties, and while Mr. Kennedy has not yet agreed to accept it is likely he will do so. Frequent meetings have been held in Wheeling, Steubenville and Cleveland, but an official of one of the interested companies states that it will probably be 60 days or more before the deal can be completed.

The La Belle Iron Works is the largest of the companies mentioned, its main plant being located at Steubenville, Ohio. It embraces two blast furnaces with a capacity of 800 tons of basic iron per day, 12 open-hearth furnaces with a capacity of 40,000 tons of ingots per month, a pipe mill containing two butt weld and two lap weld furnaces with a capacity of 2500 tons per month, eight sheet mills with an output of 4000 tons of sheets per month, two jobbing mills with an output of about 3000 tons per month of blue annealed sheets and light plates, and two large plate mills, rolling plates up to 72 in. wide, with an output of 10,000 tons per month. There is also a large universal plate mill and several skelp mills, the company rolling all the skelp it uses in its pipe mills. The company also has a large cut nail mill at Wheeling, containing about 175 nail machines, and is well fortified with ore and coal properties, being practically self-contained.

The Wheeling Steel & Iron Company is one of the oldest concerns in the Wheeling district, having been organized a good many years ago, as the result of a consolidation of the Belmont Nail Company, the Benwood Iron Works and the Wheeling Steel Works. C. R. Hubbard is president. The company's plants at Wheeling include three blast furnaces with a capacity of about 800 tons of pig iron per day, a Bessemer steel plant making 600 to 700 tons per day, a pipe mill containing three butt weld and two lap welding pipe furnaces, and also skelp mills. The company also has a puddling plant, and is a large producer of iron and steel pipe. It is a seller of Bessemer steel billets and skelp in the open market.

The plant of the Portsmouth Steel Company is located at Portsmouth, Ohio, and was fully described in *The Iron Age* of March 28, 1912. It contains seven 60-ton basic open-hearth furnaces, a 35-in. blooming mill, an 84-in. three-high plate mill, an 18-in. three-high bar mill, one 48-in., one 60-in. and one 66-in. jobbing mill, five hot sheet mills, three stands of cold rolls, together with pickling, annealing and galvanizing departments.

The Whitaker-Glessner Company of Wheeling has two plants, one at Martins Ferry, Ohio, containing six sheet mills, and another at Wheeling, containing nine sheet mills and five hot tin plate mills. The output of this company is roughly 5500 to 6000 tons of black and galvanized sheets per month, and about 30,000 to 35,000 boxes of tin plate per month.

The contract for the new Canadian Government drydock at Levis, Quebec, was awarded by the Cabinet Council to M. P. Davis & Son. The cost is approximately $2,600,000. The drydock will provide accommodation for the repair of the largest ocean liners. It is hoped to have it in operation for the season of 1915. This is the first step toward the construction of a series of Government drydocks and ship repair plants for both the Atlantic and Pacific shipping of Canada. One is to be built at Esquimault, and similar projects are contemplated for Halifax, St. John, Sydney and Vancouver. These drydocks will also have a naval defense aspect, since they will be available for British battleships in Canadian waters in time of war.

L. W. Searles is authority for the statement that the McDonald Charcoal Iron Company, will build a 100-ton blast furnace at Ellsinore, Mo., with a hardwood charcoal by-product chemical plant, the total cost to be $500,000. J. H. McDonald, of Ellsinore is to be president.

Pittsburgh and Vicinity Business Notes

The Knox Pressed & Welded Steel Company, Pittsburgh, whose works at Niles, Ohio, were burned some time ago, but which bought the plant of the Sharon Boiler Works at Sharon, Pa., expects to start up in the new location within a few days. Considerable new machinery, to be electrically driven, is being installed.

Last week receivers were appointed for the Isabella-Connellsville Coke Company, which has 260 ovens in the Lower Connellsville region. This is a direct result of the failure of the First-Second National Bank of Pittsburgh. The coke company was controlled by J. S. and W. S. Kuhn of Pittsburgh.

The Caldwell Mfg. & Supply Company, Pittsburgh, has started operations in its new plant in Hazelwood near that city. It will manufacture a full line of iron nipples, ranging from ⅛ to 12 in. and will add later a line of pipe fittings and plugs. The company has installed a power plant to supply current for electric drive.

The General Porcelain Company, Parkersburg, W. Va., will soon call for bids for the erection of a large manufacturing plant. George O. Anderson is treasurer of the company and is understood to be active in the move for a consolidation of the company's present operations in one plant.

Fire destroyed the plant of the Thornton Fire Brick Company, two miles east of Grafton, W. Va., causing a loss of $150,000. President D. L. Potter, of Grafton, says the plant will be rebuilt at once.

The report that the Youngstown Sheet & Tube Company, Youngstown, Ohio, is negotiating for the purchase of the blast furnace of the Struthers Furnace Company, Struthers, Ohio, is officially denied. About a year ago a deal was started for the purchase of this furnace, but it fell through and has not since been taken up. It is also untrue that the Youngstown Sheet & Tube Company will take over Mary furnace of the Ohio Iron & Steel Company, Lowellville, Ohio. All the pig iron that furnace will make this year will be taken by the Youngstown Sheet & Tube Company under a conversion contract made some months ago.

The entire plant of the Enterprise Enamel Company, Bellaire, Ohio, was closed down on Monday, July 14, on account of labor troubles.

The first bi-monthly wage settlement under the new and higher scales for puddling and heating recently adopted by the Amalgamated Association and Western Bar Iron Association was made in the offices of the Republic Iron & Steel Company, Youngstown, Ohio, on Friday, July 11. The sales sheets showed that the average price on iron bars shipped out by the mills in May and June was 1.50c., the same as for March and April. This entitles puddlers to $7 a ton and finishers to an advance of 2 per cent. Under the old scale which expired June 30, when bar iron was 1.50c., puddlers received $6.75 per ton. This rate of $7 a ton, which will prevail during July and August, is the highest that has been paid for many years.

At a meeting of stockholders of the Whitaker-Glesner Company, held at Wheeling, W. Va., last week, the proposed increase of the capital stock of the company from $5,000,000 to $7,000,000 was approved. Twenty thousand shares of 8 per cent. cumulative preferred stock, with a par value of $100, will be issued, about one-half of which will be offered in the open market. The company states that it has no plans under way at present for additions or improvements to its plant.

The General Electric Company has leased a half floor of the Pierce Building in St. Louis, the second largest building in the city, and plans consolidating there its Fort Wayne, Ind., offices and making St. Louis the district headquarters instead of the selling office for the Southwest.

The Newport Rolling Mill Company, Newport, Ky., is making an addition to its office building, increasing its hight by two stories. The addition to the plant of the Andrews Steel Company, a subsidiary company, is practically completed and will be in full operation within 30 days.

Steel Corporation Outlay for New Plant

In connection with his visit to the Minnesota properties of the Steel Corporation last week President Farrell stated at Duluth that the entire expenditures in connection with new construction now under way in that district would amount to $20,000,000—$15,000,000 for the blast furnaces, coke ovens, steel plant and its various rolling mills, $3,000,000 for the new steel ore dock at Duluth, requiring 36,000 tons of steel, and $2,000,000 for a cement works with a capacity of 4000 barrels a day.

At Greenville, Pa., the car repair shops to be built for the Bessemer & Lake Erie Railroad will involve a total outlay of $400,000.

There is no foundation for the report telegraphed from Birmingham, Ala., last week that the Steel Corporation would build a structural steel mill at Ensley. No large new work is now under way in that district, but further appropriations will be made for the new coal mining operation at Bay View, while at the Blocton group a new opening is to be made.

Cincinnati Molders' Strike

The molders in all but three of the foundries in Cincinnati went out on a strike for higher wages July 7. The three foundries not yet affected are those of the Lunkenheimer Company, Peck-Williamson Company and the Modern Foundry Company, the last two located at Oakley, a Cincinnati suburb. The molders demand $3.75 a day, but before the strike was called the foundry operators offered an advance of 15 cents, or from $3.25 to $3.40 a day, up to January 1, when a $3.50 rate would go into effect. This compromise was refused by the molders and it has since been withdrawn by the foundrymen, who claim that business conditions do not really warrant any advance in wages at the present time. There has been no violence and both sides are making preparations for a long drawn-out contest.

In all nearly 1200 molders and coremakers are idle and 28 foundries have been shut down. If it should be prolonged the strike will affect the operations of machine tool builders, most of whom are dependent on jobbing foundries for their castings.

The Merchant & Evans Company has recently moved into its new warehouse at 315-317 Champlain avenue, Cleveland, Ohio, where an extensive stock will be carried of Merchants' high grade roofing and bright tin, sheet iron, Star ventilators, sheet zinc, sheet copper, solder, babbitt metal, etc. The Cleveland house of this company is under the management of J. C. McIlroy, who formerly represented it in the Middle West States.

L. Vogelstein & Co., 42 Broadway, New York, furnish the following figures of German consumption of foreign copper for the months January to May, 1913: Imports, 94,920 tons; exports, 4353 tons; consumption, 90,567 tons, as compared with consumption during the same period in 1912 of 80,347 tons. Of the above quantity 81,449 tons was imported from the United States.

The 18-in. mill at the Mahoning works of the Republic Iron & Steel Company at Youngstown, Ohio, is to be abandoned. The mill was built many years ago for rolling iron rails, but later it was changed to roll shapes by the Mahoning Valley Iron Company and was finally taken over by the Republic Iron & Steel Company.

The American Pulley Company has moved its New York branch from 203 Lafayette street to more commodious quarters at the corner of Grand and Green streets. At the new address is carried a complete stock of American belt pulleys. Orders will be received for reels, spools, beams, sash pulleys and pressed steel shapes.

The Otis Steel Company, Cleveland, Ohio, has placed an order with the Babcock & Wilcox Company for six 588 hp. boilers for the power plant in connection with its new finishing mill. Other equipment for this plant, not already bought, will be purchased shortly.

Inspection of Materials and Finished Product*

Methods Employed in the Plant of the Packard Motor Car Company, Detroit — Checks at Every Step in the Process of Manufacture

BY E. F. ROBERTS

There is no more positive evidence of the general desire among American manufacturers today to deliver to the buying public a dependable product, honestly made, than the general interest in inspection methods. In large industries, perhaps the first feature that should be considered in an inspection system is the relation of its personnel to the rest of the organization. To secure the determined and inflexible adherence to the standards of quality and workmanship laid down by the management, members of the inspection department cannot be in any degree subject to the control of any shop foreman or any executive directly producing. It is an emphatic axiom that the average workman thinks of his job first and duty afterward; and an inspector refusing to pass defective work for a foreman who can discharge him is, commercially, an imaginary quantity.

Inspection in Six Productive Divisions

For convenience of administration the plant of the Packard Motor Car Company is organized into six productive divisions designated as chassis, body, truck, forge, foundry and service divisions. Each division constitutes a unit in itself, not only as regards productive organization, but also as concerns its inspection force. Each division's inspection corps is in charge of a general head and over all the division extends the authority of the chief inspector. This executive is responsible directly to the general superintendent, is personally a thorough and experienced mechanic, familiar with general engineering practice, standards and limits, and also an expert as regards manufacturing conditions, gauges, systems, tool design, etc. With his assistant and through the division heads and foremen inspectors in charge of buildings and, in some cases, large departments, he is in direct control of every inspector in the plant.

Foremen inspectors may to a limited extent perform actual inspection work, but their duty is essentially that of maintaining the efficiency of the men and methods under their supervision. They must be actively watchful of the care used in checking parts, must see that all parts brought up are handled promptly and that gauges and instruments are properly used and, above all, kept continuously in first-class condition. Through their personality the policy and standards of the entire inspection system must be impressed upon every individual in it and the quality of their department output is a standard for which they are directly responsible. Regular department foremen may report infractions of discipline by inspectors and have prompt action taken by the chief inspector, but individual inspectors in departments are wholly free from any constraint in criticising poor workmanship.

Every operation and every part is passed or rejected absolutely upon its conformity, or lack of it, with the blue print. Large placards are conspicuously posted in every department warning inspectors that immediate discharge will result from passing work on any other basis, except written authority of a general executive. Every possible means is thus employed to impress upon the inspectors that their sole responsibility is the maintenance of quality, and that their positions depend upon this and nothing else. An inspecting force, although necessarily recruited from various sources, should consist mainly of men of previous experience and training in other mechanical departments of the plant. All inspectors should further, when first assigned to this duty, be placed in company with an experienced man and their work carefully watched for a number of days before giving them individual assignments. Special care should be exercised in selecting and examining them; they should be well paid and every possible effort made to hold satisfactory men permanently on the line of work in which they have become expert.

The function of an efficient inspection department should begin even before the drawings are approved in the engineering department. The chief inspector should be *ex officio* chairman of the limit committee, whose duty it should be to pass on all drawings to determine whether the limits assigned by the designer are commercially practicable, thus ensuring the elimination of many possible sources of later friction and delay. After the drawings for a new design are approved and signed by the limit committee, and not until then, they should be issued to the various functional divisions, the set in which the inspection department is interested being that sent to the tool room. These, of course, should be checked over to determine the new tools and fixtures required—and also on the inspection department's behalf—to determine the new gauges necessary, preparation thus being under way for the inspection of the finished product, in some instances, even before the raw material is ordered.

Analysis and Other Tests of Material

Material should be for inspection purposes divided into raw stores, including bar, tubing and sheet metal; car parts rough, comprising castings, stampings and forgings; body parts rough, such as lumber, leather, glass, trimming fabrics, and car parts finished and semi-finished. To insure uniformity of composition and quality all metals should be bought on the basis of standard analytical specifications, developed by the engineering department through laboratory test and research. Supply firms, before making up an order, should send in sample test pieces for approval, insuring in this way almost invariable conformity with the specifications and eliminating delays and arguments. In the case of ordinary bar stock, as soon as a consignment is received and checked in as per invoice, it should be inspected for size, limit snap gauges being used and each end of each bar being checked. Straightness also should be noted, as occasionally a bar may be found that would not pass readily through the machine collets. A bar should then be selected at random and a test piece 3 or 4 in. long sawed off. This should be tagged with the date, amount of consignment, grade of metal and the purpose used for, and forwarded to the laboratory for analysis.

The laboratory is exceptionally complete and well equipped for analytical and physical research. It is in charge of a chemist and engineering specialist of wide experience; and every imaginable determination required in industrial engineering can be covered in this department from the crystalline structure of the antimony content in crankshaft bearings to the tons of pressure required for the breakage test of a front axle. Special rush service can always be had from a laboratory of this description in 12 hr., although ordinarily 2 days are allowed. As soon as the test piece has been removed, each bar should then have the grade number and date stamped on the end and the consignment should be placed in the regular rack pending receipt of the laboratory release.

After analysis the duplicate stub from the specification tag will be removed by the laboratory and returned to the stock department, thereby either releasing the consignment for factory use or rejecting it as unfit. If the analysis is satisfactory, the stockkeeper should then paint the ends of all bars in this lot with the standard color for that grade, indicating its readiness for use. To insure this method being given proper attention, personal instructions must be issued, and as a further precaution, signs should be posted warning the men that painted ends must never be cut off and that all bars must be placed in the racks, painted ends out. If the laboratory analysis shows the sample below grade limits, the stock department should notify the purchasing department and arrangements should at once be made either for the return of the consignment or its substitution for any other use for which it may still be fit. Bar stock intended for special use, such as piston pins, uni-

*A paper (nearly in full) read at the Summer Meeting of the Society of Automobile Engineers, Detroit, Mich., June 4-7, 1913.

versal joint pins, etc., or selected stock, should be kept in special separate bins.

The same general method should be followed in the inspection of tubing except that it must be checked for inside diameter or thickness of wall, as well as outside diameter, and also for eccentricity. Standard sheet metal, aluminum, brass, copper, steel galvanized sheets, etc., from established firms need ordinarily be checked only for gauge and general appearance and accepted without analytical test. In the case of stamping stock, however, a test strip 1½ x 12 in. should always be submitted for analysis and tensile test. In such instances the same procedure would be gone through with as in the case of bar stock, except that a different method of marking (surface stamping) must be used.

Forgings and Castings

For insuring the correctness of forgings the regular practice should be to submit a lead proof for a preliminary check before the dies are hardened. The lead as soon as received should be delivered to the purchasing department for record and forwarded by it to the engineering department for general checking as to design specifications. If satisfactory it should then be transmitted to the tool department, where it must be laid out and carefully gone over in detail with the drawing, and this opportunity should also be improved for comparing it with the design of any fixtures and gauges relating to this part. As soon as this check is completed the tool room inspector should immediately advise the purchasing department as to approval or rejection.

If approved, as soon as delivery of forgings begins, a few of the first may be selected at random and again checked over in every detail to cover any possible deviation on the dies or negligence on the part of the operator. Important parts subjected to heavy stresses, such as axles, steering levers, steering knuckles, steering worm, transmission gears and parts, should invariably pass the analytical test for every consignment also before being released. Once the correctness of the dies has been established, forgings need not individually be checked for detail specifications, but every one must still be carefully examined for flaws, cold-shuts, etc., and every now and then a single forging should be again inspected in every detail of dimension and material to insure the continuous maintenance of the original standard.

Patterns for castings should in every instance be closely checked by a special inspector before being released for use, thus eliminating chance of error as much as possible, in the initial state. As soon as the first casting from any pattern is completed, it should be at once forwarded as a test sample and submitted to the same inspection and detail checking as that given forgings and the same routine may be followed in rejecting or accepting it and approving delivery. In the foundry, test bars are run from every melt and regularly analyzed and tested for physical properties. Individual castings are inspected in detail as received, although not laid out for every operation.

In general casting inspection cored holes and bosses should, however, be checked to discover any possible variations due to core shift, and the entire casting should also be carefully scrutinized for sand or blow-holes. Doubtful places must be tapped with a hammer, or, to determine leakage, tested with gasoline. The scleroscope test may also be employed in case trouble is experienced on account of excessive hardness. Stampings should be covered by an initial inspection practically the same as that given forgings, except as regards tool work, since they are usually a finished product when received, requiring ordinarily only a polishing, enameling or similar operation. Such exceptions as do require machining to any extent must be given the same thorough checking and testing that the forgings are subjected to.

The methods and regulations for the inspection, analysis or test of all stock and parts entering a plant are intended to, and we believe do, guarantee the quality and fitness of every item of material comprised in the car. Perfect material, above all else, is the requisite of first importance. Poor workmanship may spoil good material, but no amount of good workmanship can ever redeem poor material.

Parts in Process

Factory inspection of parts in process in a large organization can be best conducted almost entirely on a departmental basis. In a small plant a central inspection department possesses certain advantages, but with the growth of any business, the time required for trucking and handling must eventually make this method obsolete. In each department a central location should be selected, well-lighted and convenient, and here at inspection plates should be installed the head inspector and his assistants. The inspection plates used in the Packard factory are of cast iron, 24 by 57 in., and of massive and rigid construction. They are planed and finished on top to an accurate surface and carefully used and looked after, being covered every night with a coating of oil and frequently tested for trueness. At these sit the inspectors, provided with blue prints covering every part handled in the room and with standard or special gauges for checking every operation; and to them are brought all the various lots of parts as fast as completed in each operation.

The System of Gauges

The greatest factor in quick and thorough inspection is an efficient system of gauges. There is no more common fallacy in manufacturing than the assumption that a correct set of gauges once issued insures accuracy of workmanship. And a pretty general fallacy is the assumption of correctness for the gauges themselves. Ordinarily the micrometer is accepted as the standard of measurement. When, however, it is remembered that the average micrometer will alter merely by the heat of the hand to an extent of 0.0002, it is obvious that the court of final appeal for accuracy must be a higher one. There can be no more absolute precision standard than the Johannson system of gauges. A set of these gauges consists of 81 blocks, increasing in size by graduations of 0.0001 in. They are manufactured in Sweden, the completion of a single set requiring about five years and the surfaces when finished being so perfect that atmospheric pressure will hold a dozen of them suspended in a cluster from one held between the fingers in the same manner as though magnetized. In addition to their almost infinite accuracy they are so impervious to variations of temperature that one of them may be carefully checked in a warm room with the most sensitive instrument possible and then after being laid on ice again checked without showing the slightest variation. These gauges may be accepted as the final source of authority on the accuracy of all manufacturing dimensions. They should serve as the check for all master gauges, which in turn check the shop sets.

Special gauges, of course, must be designed in the tool drafting room as soon as the original design of a new model is issued. Standard gauges, however, are required in such large quantities and the efficiency of any inspection system is so dependent upon their immediate accessibility that standard blanks for snap, plug and ring gauges should be carried in stock at all times. These may be made up rapidly and at low cost principally on automatics, leaving only sizing and finishing operations for the toolmaker. This method renders gauge equipment so readily accessible that there is no incentive or excuse for negligence in this respect. All rough, stock sent into the factory in dimension lengths should be cut to gauge in the stockroom. The workman who machines it shou'd have a gauge for his operation which is a duplicate of the inspector's. The inspector's gauge is thus a check on the accuracy of the workman's gauge, and all the inspector's gauges should be in turn checked at regular intervals with the master gauges held in the tool room.

Too much emphasis cannot be placed upon the importance of properly checking and caring for the master gauges. The set should be at least sufficiently complete to cover every important part. They should be given not less than three different checks with the Swedish master blocks by three different inspectors and these separate readings reconciled before being approved for use in the first place. They should be kept in vaults under lock and withdrawn only on fixed occasions or by some executive's order and then only by the man or men regularly assigned to the duty of handling them. No attempt should be made to use them indiscriminately for checking shop gauges, as their function should be the control of the inspectors' gauges only. Every gauge in every department should be turned into the toolcrib at the close of working hours. Some of the more important ones must be checked daily before issue and very few should be permitted to be used unchecked for more than a week. Limit thread gauges in particular must

be checked with the master gauges every few days for accuracy of dimensions and depth of thread.

All gauges must be sized to the limits shown on the print and only parts coming inside these limits passed. Parts outside the limit, except where the defect is a nominal one only, such as oversize, may be sent at once to a central checking station. All parts received here should be examined daily by the chief inspector or his assistant and the division superintendent or his assistant. The reason for the defect should be clearly determined and if tools are at fault the proper correction at once made. If, as is usually the case, the cause is negligence on the part of the operator, the foreman's attention must be called to it and both he and the operator warned against a repetition. In the department itself, the inspectors, as soon as a defective lot of parts appears, should issue to the foreman a written "stop-notice" or warning that a certain operator or certain machine is producing work below standard. This will insure immediate attention, as it puts the responsibility squarely up to the foreman. When all the operations on a given part are completed in one department, the inspector's O. K. should be again required before they can be forwarded to the next one.

There is no possibility under the Packard method of any lot of parts accidentally escaping inspection. The operator's pay for every lot and every piece worked on is absolutely contingent on the inspector's O. K. and every workman for this reason is continuously watchful to prevent negligence on the part of his department inspector. Even dishonest inspection has little incentive since the time slips on file bear so complete a record that the responsibility for such work may be very easily determined. Thus at every step in the progress of a part it is possible to so check and safeguard it as to insure its conformity to the standard of quality.

Thirteen Steps in Gear Inspection

To illustrate in detail a thorough method of supervising the maintenance of inspection standards, we may follow the development of a typical forging, the bevel driving gear, as carried through its various operations in the factory. In one respect this gear is given special inspection by receiving a supplementary analytical material test. The steel from which it is forged is given the regular laboratory analysis before being released to the forge division, but, in addition to this, because of the importance of the part in regard to both strength and quiet running, a material test is taken on each lot of forgings received. Chips are removed from a sample, and analyzed, and the whole lot are held until the result of the analysis is known. The blanks after release are heat treated and then sent to the lathe for boring and reaming the larger opening for the differential casing and turning the face of the web. The blank is then sent to the plate and the dimensions and surfaces checked. The piece is next taken to the milling machine and the four slots for the differential spider are cut. For the second time it goes to the inspector, to determine whether the slots are central, at right angles to each other, square with the surface of the web and true to size within a limit of one half-thousandth plus or minus.

Next the outside diameter is rough-turned and the face angle finish-turned, making necessary the third trip to the inspection plate. Again the blank is sent to the lathe for finish-turning the outside diameter and the back angle and sizing the width of the tooth plane. This makes necessary the fourth inspection, after which, if passed, it is sent to have the face of the tooth-plane ground to the correct angle with the web. For the fifth time an inspector checks it before it is passed on to have the back of the web surfaced preparatory to copper plating for hardening. After plating the teeth are rough and finished cut, which makes necessary inspection No. 6. The gear is next sent to the heat-treating department and first pack-hardened or carbonized. In the carbonizing pot along with each lot of gears is placed a test piece of the same material as the gears, about 6 in. long and ½ in. square. After the specified interval for this grade of steel, the gears and test bar are removed, cooled and reheated for hardening. After hardening they are cleaned and the test bar is broken and checked for depth of case, fineness of grain and general structural appearance, as an index of the internal condition of the gears.

The gear is now ready for the most important of all its inspections, the strength and hardness test. Hardness is measured by the scleroscope, which compares the condition of the part with that of the standard established by the Brinnell testing machine. Between 30 and 40 readings are taken from each gear. Strength is determined by the hammer test, a device which permits the concentration of a heavy blow of known force on a single tooth, each gear being given this test on at least four different points in its periphery. These tests may be considered as inspections Nos. 6 and 7, and are immediately followed by inspection No. 8, which is the test applied by a special fixture for determining the amount of possible distortion due to heat. This inspection is rigorous and minute, covering every tooth of every gear; and the gear that checks 0.002 in. eccentric on the pitch circle is rejected. The diameter of this circle is 13 in., but the limit of variation that any gear can show and pass is only 0.0015 in.

When successfully past this inspection the gear is ready to be ground on its outside diameter and on the face of the teeth, and this in turn leads to inspection No. 9. Another grinding operation on the back and face of the web and again an inspector must check the accuracy of operator and machine, this time permitting a limit of variation of only 0.0005. The final grinding is the finish of the opening for the differential case, which is followed by inspection No. 11. The last machining operation is the drilling and reaming of the differential casing bolt holes, which, in inspection No. 12, are checked for size and spacing. Absolute conformity to specifications is the standard for this operation, no variation being permitted. Not yet, however, may the gear be released as a finished part, as it may still fail on No. 13, the final inspection. This consists of a test on a special fixture again, for checking the correctness of the tooth-bearing and smoothness of roll, and but little less than perfection is required of the gear that is finally passed through. As a finished product it is obvious that a large percentage of the cost of the gear is due to the continual supervision of the inspector, but it should also be equally obvious that the result is an article as near to the ideal of mechanical perfection as the best of equipment, skill and scientific testing can achieve.

From the tests made at Purdue University, Lafayette, Ind., to determine the breaking strength of pulleys of wood, paper and steel, and to learn their principal points of weakness, some of the conclusions are as follows: 1. Rim joints midway between arms are serious defects and materially reduce the bursting speed. 2. The solid-web-and-rim paper flywheel will safely withstand a peripheral speed of 106 ft. per sec. 3. Wood flywheels with solid rims have an ample factor of safety at a peripheral speed of 90 ft. per sec., if the wood is of good quality. 4. Steel wheels of the split-rim type are unsafe at speeds above 80 ft. per second.

The Independent Pneumatic Tool Company, Chicago, reports that the increased demand for its Thor air tools has necessitated numerous additions to buildings and equipment at the plant in Aurora, Ill., and it has now become necessary to remove its motor cycle manufacturing department into another factory for the purpose of increasing further the output of pneumatic tools. The motor cycle department is being removed to Chicago, and the factory in Aurora will henceforth be devoted exclusively to the manufacture of Thor air and pneumatic tools. The output will be 1500 air tools and 500 electric drills per month.

Creditors of the Webb Company, Allentown, Pa., manufacturer of automobile fire apparatus, have recommended the appointment of Robert E. Wilbur as receiver. It is said that the company has orders aggregating $373,000. Assets are reported as $557,000; liabilities, $384,000. Lack of working capital is given as the cause for the receivership.

The Chicago Steel Products Company, Chicago, has been awarded contracts for the steel work for five coaling stations on the Gould lines, one on the Chicago, Burlington & Quincy and one on the Lake Shore & Michigan Southern, totaling about 175 tons.

The Machinery Markets

Viewed in a broad way the machinery markets are quiet, although some special lines of machinery are in fair demand and in a couple of cities some slight improvement is noticed in the call for standard metal working tools or other equipment. In New York lack of demand from small manufacturers is particularly noticeable. Quiet continues in Philadelphia because of the season and other influences heretofore noted. New England reports a little less activity, although manufacturers of special machinery are doing better than they did in June. In Cleveland there has been a slight improvement in the small order trade and second-hand machinery is slightly more active. Both domestic and export business has dropped off to such an extent in Cincinnati that there is little worriment over the molders' strike now in progress there. A steady run of single tool orders has caused some betterment in Detroit. Many shops have slowed up in Milwaukee, though those making milling machines and some other machine tools are exceptions. In the Central South trade has been generally fair, with boilers in especially good demand, which is considered a favorable indication. St. Louis has had fair inquiry for single tools and a better demand for second-hand machinery than can be supplied easily. In the Birmingham district there is a brisk inquiry for cotton ginning plant machinery and gas engines are in good call. Trade activity continues in Texas and the excellent crop prospects are promising for later business. The demand for metal working equipment is moving more slowly on the Pacific coast and sawmill and logging equipment is not as active as it should be because of unsatisfactory conditions in the lumber market.

New York

NEW YORK, July 16, 1913.

The Delaware, Lackawanna & Western Railroad began placing orders in the latter part of last week against its list of several weeks' standing. Orders were fairly well distributed among local houses and in the aggregate made the best piece of business since the recent United States navy yard purchases. Thomas H. Dallett, Philadelphia, has completed the purchase of tools and machinery to equip his new shop on Broad street for the manufacture of pneumatic tools. The Locomotive Stoker Company, Schenectady, N. Y., has been in the market for a few machine tools. The machinery business generally is quiet, inquiries as well as orders having fallen off sharply. The lessened demand is due particularly to conservatism on the part of small manufacturers whose requirements while small individually are essential to a good volume of business. Complaint is heard from some dealers that collections are not good and that unreasonable concessions are wanted in the matter of prices and settlement. On the other hand some of the sellers of special lines of machine tools whose product can reduce cost of production have made fair sales since July 1 and declare themselves satisfied considering the season and other conditions. A good part of this business is the culmination of hard work on old quotations. The threatened strike of conductors and trainmen on Eastern railroads naturally had a disturbing effect upon the trade and much relief was felt when the probability of arbitration loomed up. Very little railroad business is now in prospect.

The De Laval Separator Company, Poughkeepsie, N. Y., is adding to its plant a 5-story building 60 x 120 ft., which will be used for light manufacturing.

The Full Fashioned Silk Hosiery Company, Albany, N. Y., has filed articles of incorporation with a capital stock of $200,000, and will manufacture hosiery and gloves. Paul Del Gallego, Julian A. Arroyo and T. C. Weydant are the incorporators.

The Catskill Foundry & Machine Works, Catskill, N. Y., is arranging to engage in the manufacture of Corliss engines.

The Lewis-Weller Company, 120 Erie street, Utica, N. Y., has commenced work upon a two-story and basement addition, 42 x 160 ft., which it will make to its manufacturing building.

Cluett, Peabody & Co., Troy, N. Y., will erect a concrete and steel building, 30 x 50 ft., to house the first section of a new boiler plant to consist of two 300 hp. boilers. The engineers, Westinghouse, Church, Kerr & Co., New York City, will design the plant and make the installation.

The Wood End Container Corporation, Lockport, N. Y., has been incorporated with $30,000 capital stock and will establish a plant for the manufacture of containers and for doing a general woodworking business. The directors are L. Newman, Buffalo; E. D. Corson and G. A. Castle, Lockport.

Architect Marcus T. Reynolds, 100 State street, Albany, is completing plans for a four-story industrial building, to contain 85,000 sq. ft. of floor space, to be erected by citizens of Albany. Peter D. Kiernan is chairman of the building committee. Bids will be taken about August 1. The estimated cost is $185,000.

The Minoru Mills, Inc., Albany, has been incorporated by Edward J. Lacy, Abraham Besser and Nathan Lieberman, and will engage in the manufacture of cotton and silk threads. A manufacturing plant is being arranged for.

The Dietz Lantern Company, Syracuse, N. Y., has purchased additional land adjoining its present plant and will erect a new factory building to cost $70,000.

The Rudolph Wurlitzer Mfg. Company, North Tonawanda, N. Y., has let contract to the Turner Construction Company, Buffalo, for an extensive addition to its plant for the manufacture of musical instruments.

The Elmira Water, Light & Railroad Company, Elmira, N. Y., has let the contract for its new power house to the Pulford & Dempsey Construction Company. The cost with equipment will be $70,000.

The Mohawk Gas Company, Schenectady, N. Y., has let the contract for foundation for its new 2,000,000 cu. ft. gas holder to the MacArthur Concrete Pile & Foundation Company, New York City. The retort house which the gas company will build on Via road will be 53 x 112 ft., and will cost $71,000.

The New Process Gear Corporation, Syracuse, N. Y., has let contracts for a two-story addition, 41 x 99 ft., to be made to its office building.

The West Side Foundry Company, Troy, N. Y., states that the recent fire at its plant practically destroyed all of its woodworking, metal pattern machinery and motors, the larger part of which has already been replaced.

New England

BOSTON, MASS., July 15, 1913.

The dealers report sales have fallen off, which may be attributed somewhat to the season. The manufacturers of the more special machinery are very busy. For example, the Potter & Johnston Company, Pawtucket, R. I., is rushed with business. June was not so prosperous in the way of orders as May, but July shows a marked improvement. The company reports that foreign orders are by no means abnormal as compared with domestic.

The business of H. S. Barr, Worcester, Mass., manufacturer of drilling machines, was sold at auction July 8. The sale included everything. One lot comprised the name, good-will and the right to manufacture without reserve the Barr patented combination single and multiple spindle drilling machines and the spindle tapping machine, together with the patents, patterns, drawings, and finished and unfinished parts. The book value was ten times the selling price, $2125, paid by the Brownell Machinery Company, dealer, Providence, R. I., who, it is said, represented a builder of drilling machines. A patent covering a mechanism for spindle drawing was sold for $187.50 to Goldberg & Edinberg, Boston. A third lot, comprising patents pending and issued, was not sold, because the minimum price of $1400 was not reached in the bidding. The machine tool equipment went at low figures, in sharp contrast to other recent auctions where some of the prices paid were abnormal, considering the market. The machine tool

auction became an institution in New England in 1907, when the shop equipment of the Shaw Manufacturing Company, Lowell, Mass., was disposed of at sensational prices, largely due to the fact that the market had been swept clean of stocks and deliveries were far in the future. This sale seemed to have an effect upon other sales which followed, for prices have in most instances been very good. The Barr auction is considered by some experts to indicate a reaction, for many good machines went for hardly more than a song. The total receipts for everything—equipment, patents, business, stock—were about $12,000, hardly one-third of a recently reduced inventory. Mr. Barr retires to take up farming in Florida.

The Gilbert & Bennett Mfg. Company, Georgetown, Conn., will build a power plant having a boiler room 40 x 60 ft., for upright boilers, and an engine room 25 x 48 ft.

The Springfield Mfg. Company, Bridgeport, Conn., has brought out two new types of ball-bearing tool-grinding machines. The wet machine has no pump, the water level being regulated by a raising and lowering reservoir. It takes a 2½-in. x 20-in. wheel. The dry-grinding machine, furnished either with or without a hood, is built in two sizes to take 4 in. x 24 in., or 2 in. x 16 in. wheel.

Work is proceeding rapidly on the new plant of the Standard Machinery Company, Providence, R. I., manufacturer of rolling mills, drop hammers, presses and roller and ball bearings, at Auburn, R. I., and the company expects to occupy its new quarters in September. The main building will be 175 x 325 ft., two stories, for 250 ft. of the length, and one story for the remaining distance. The forge shop will be 70 x 100 ft. and the power plant 70 x 70 ft. Much new equipment has been ordered, including what is said to be the largest steam hammer in New England, weighing 60,000 lb. and having a hammer weighing 2800 lb. A new 10-ton electric traveling crane will supplement in the main craneway the 7½-ton crane now located at the company's shops on Beverly street, Providence. Altogether there will be nine cranes. The works are adjacent to the plant of the General Fire Extinguisher Company, and on the property will be located the new plant of the Hope Foundry, now of Warren, R. I., which manufactures the Standard Company's castings. The main building will be 100 by 180 ft., with a wing 35 by 75 ft. for pattern storage and another 40 by 75 ft. for a carpenter shop. The Standard Machinery Company reports a very large business, requiring a full manufacturing capacity. An easing up in June has been corrected by an increase in orders in the first half of July. The condition applies both in the machinery and ball and roller bearing departments.

The Silverman Bros. Mfg. Company, Providence, R. I., manufacturer of jewelry, will erect a large factory building near Broad street.

G. L. Davison, 4 Belcher street, Winthrop, Mass., is taking preliminary steps to put on the market a new type of drop hammer, for which the Thomas & Lowe Machinery Company, Providence, R. I., is the general agent. The machine has the original feature of a spring reinforcement of the hammer which accentuates its blow. Attached to the housing just above the hammer is a vertical pipe which acts as the guide of a powerful locking device and released at the predetermined point by a tripping mechanism. The impact of the hammer is that of its weight combined with the stored up power of the spring. Tests have demonstrated that under these conditions a 50-lb. hammer will strike a blow of 146 lb.

This week the Norton Company, Worcester, Mass., is conducting its summer school for its salesmen, of whom 27 are in attendance, representing all parts of America as well as Europe and Canada. The course is comprehensively interesting, covering details of the products of the Norton Company and the Norton Grinding Company. Inspections of the plants and lectures by experts will continue through Friday afternoon.

The addition which will be erected by the Metz Company, Waltham, Mass., manufacturer of motor cars, will be 200 x 200 ft. and will be used for manufacturing. The building will contain all the heavy machinery, part of which will be moved from the present plant. The building will not be ready for occupancy before November 1.

The factory of the I. C. Yale Mfg. Company, Yalesville, Conn., manufacturer of silverware, was burned July 8 with an estimated loss of $200,000.

The Imperial Sewing Machine Company, New Haven, Conn., of which H. Tyree is the president, purposes to establish a large factory at New Haven for its American trade and a European plant, probably at Brussels, Belgium.

Additions to general manufacturing facilities of New England include the new mills of the Warren Worsted Company on Franklin street, Providence, R. I.; Howard Dustless Duster Company, South Boston, to take the works at Winchester, Mass., erected by the Linoid Company and add to them, and the Hollingsworth & Whitney Paper Company, Winslow, Me., tower to contain three additional acid mixers.

Philadelphia

PHILADELPHIA, PA., July 14, 1913.

Quiet conditions continue. Buyers show little interest in the market, pending negotiations drag, and new business develops slowly. Much of the dullness is attributed to the midsummer season, although no doubt a considerable share of the hesitancy is due to tariff uncertainties, which affect the trade both directly and indirectly. Current business in machine tools has been confined to single tool sales. Railroad buying is at a standstill. Few of the recent inquiries for tools have been closed, railroads paying more attention to threatening labor troubles than to purchases of equipment. The second-hand machinery market is inactive, reflecting conditions in the general trade. There has been little export movement. Power equipment continues in fair demand but some of the larger power plant propositions move slowly. Foundries are fairly busy, although steel casting plants are not very well supplied with orders for forward account.

A programme recently announced, made possible by agreements between representatives of the municipality of Philadelphia, the Pennsylvania, Baltimore & Ohio and the Belt Line railroads, involves the expenditure of approximately $18,750,000 for the removal of grade crossings, building of piers and the establishment of vast freight yards, warehouses, etc., in the southern section of the city. The construction of a belt line railroad, open to the use of both the Pennsylvania and Baltimore & Ohio railroads is part of the plan. On some of the cross-town railroad lines elevated tracks will be built. A 600-acre freight yard is planned and some 4000 ft. of water front will be reclaimed. It is expected that the work planned will be completed in three years. Approval of the plans and agreements require the approval of City Council, which is believed to be assured.

The trade is much interested in the proposed improvements and extensions to the League Island Navy Yard. A recent visit of Secretary of the Navy Daniels, with his expression of approval toward the increased capacity of the yard, has resulted in a bill being introduced in the House of Representatives appropriating $950,000 for the purchase of equipment necessary to make the yard a first-class shipbuilding plant, at which the Government will be able to build battleships and other vessels.

Local contractors are estimating on plans by W. W. Wysor, chief engineer, for the construction of the Fairview car house and office building to be erected near Allentown, Pa., for the Lehigh Valley Transit Company.

Revised plans are being prepared by H. Zimmerman for the proposed addition to the factory of E. H. Gillinder & Sons, Tacony, Philadelphia, glass manufacturers.

Plans have been filed for a four-story brick factory building, 36 x 90 ft., to be erected at Filbert and Thirty-seventh streets for the Alloway-Martin Company, manufacturer of automobile bodies. Plans are by Peuchert & Wunder, engineers.

Contracts have been awarded, it is stated, to W. R. Brown for the erection of two buildings, 103 x 110 ft., two and three stories, for the Harbison Dairies, 2015 Coral street. The buildings will be of brick, concrete and hollow tile. Steel sash will be used.

Sauer & Hahn, architects, are preparing plans for an eight-story loft building, 46 x 121 ft., to be erected at Thirteenth and Filbert streets for Louis Biberman & Bros. Electric light and steam heating plant, elevators, etc., will be included in the specifications.

Revised plans are being estimated on for the proposed three-story and basement machine shop and manufacturing building to be erected for the Central Machine Company at Seventh and Wood streets. Peuchert & Wunder are the engineers.

Work has begun on the new shop of the Landis Machine Company, Waynesboro, Pa. The building will be 80 x 200 ft., of brick and steel construction and two stories.

Owing to the increased demand for its products, the Lebanon Creamery Company, Lebanon, Pa., will erect a new condensed milk factory and ice and refrigerating plant.

Bids will be received by W. F. Clemens, secretary, Clayton, Del., until July 21 for waterworks and a sewerage system.

George Raudman has received a permit to erect an addition to the present plant of the Bond Bottle Sealing Company, Wilmington, Del., at a cost of $26,000.

The Electric Hose & Rubber Company, Wilmington, Del., has had plans prepared for an addition to its plant, 32 x 224 ft., two stories, of brick slow burning construction, with fire-proof windows, which will increase its capacity 25 per cent.

Plans are being estimated on for an eight-story brick, steel and concrete flour and feed warehouse to be erected for the McCormick Estate, Harrisburg, Pa., and leased by the Paxton Flour & Feed Company, of that city. The building will be 97 x 291 ft., entirely fireproof. Modern equipment is to be installed.

It is reported that engineers of the Pennsylvania Railroad are preparing plans for a large car barn to be built on the site of the old base ball park in Atlantic City, N. J.

It is stated that the Coca-Cola Company, Baltimore, Md., is having plans prepared for the building of a large plant in that city, including an extensive cold storage and refrigerating plant. Details are not yet available.

Chicago

CHICAGO, ILL., July 14, 1913.

The Illinois Malleable Iron Company, Chicago, is building a one-story power house, 47 x 71 ft., at a cost of $5000.

Lyon & Healy, Chicago, manufacturers of pianos, have taken out a permit providing for the erection of a four-story factory, 140 x 400 ft., at 4100 Fullerton avenue. The cost is estimated at $300,000. Hyland & Green, 29 East Madison street, Chicago, are the architects.

The Siegel Hechinger Company, 951 West Thirty-eighth street, Chicago, will build a power house, 53 x 93 ft., to cost $35,000.

The Paltridge Metal Equipment Company, 729 Monadnock Building, Chicago, which will shortly erect a new factory for the manufacture of steel shelving, filing cases and other metal equipment, is in the market for a 10-ft. power press to cut 14 gauge metal, and a heavy press similar to the Ohls 10-ft. weighing 28,000 lb.

The Elgin Auto Sewing Machine Company, Elgin, Ill., advises that it will be in the market for additional machinery upon completion of its new building in about three months.

The Ottawa Silica Company, Ottawa, Ill., has begun work for its new factory to be built on the site of the old plant. The new building will be 100 x 200 ft., constructed of steel, reinforced concrete and galvanized iron, and will cost about $40,000.

The board of education of Spring Valley, Ill., is having plans prepared for a manual training school and power house in conjunction with a new high school. An expenditure of $100,000 is contemplated. Grant C. Miller, Chicago, is the architect.

The Sioux City Service Company, Sioux City, Iowa, is planning a $20,000 addition to its engine room. New equipment will be installed.

The city of Roseau, Minn., has awarded the contracts for its new electrical power house and waterworks system.

The American Paper Stock Company, St. Paul, Minn., has taken out a permit for the erection of a $55,000 factory on Wabash avenue and Myrtle street. The new building will be three stories, of brick and reinforced concrete construction.

On July 2 a fire entirely destroyed the tin, wood, paint and pattern shops of the Pioneer Tractor Mfg. Company, manufacturer of gas traction engines, Winona, Minn. New equipment is being installed and the company states it expects to be in full operation within ten days.

The Ellison Machine Company, Marengo, Ill., has been incorporated with $10,000 capital stock, by A. D. and W. F. Ellison and F. G. Stevens, and will equip a plant shortly.

Ground has been broken for the buildings to be occupied by the new shops of the Chicago & Alton Railroad at Bloomington, Ill., which will involve an expenditure of about $1,000,000 for buildings and equipment and will require about two years to complete.

The Midland Metal Mfg. Company, Ottumwa, Iowa, will erect an addition, 60 x 100 ft., to its present plant, and announces that it is in the market for sheet metal working machinery for manufacturing tanks, barrels and specialties.

The Western Oleomargarine Company, Denver, Colo., has begun breaking ground for the construction of a $20,000 plant at Welton street and West Colfax avenue, in that city.

Detroit

DETROIT, MICH., July 14, 1913.

A gradual betterment in general conditions in the local machinery market occurred the past week, all the more noticeable on account of the extreme dullness of the week previous. There has been a steady run of orders for single tools and small lots and some demand for the heavier types of machinery. Inquiries are comparatively plentiful and are coming chiefly from the general manufacturing trade. A moderate movement in second-hand machinery is reported. The demand for boilers and engines is rather limited but there is an improvement in the call for tanks. Here and there foundries are curtailing their operations somewhat, but the general conditions in the trade continue satisfactory. Contractors are busy.

Smith, Hinchman & Grylls, architects, Detroit, are preparing plans for a brick factory building, two stories in hight, 95 x 104 ft., to be erected for the Detroit Oak Belting Company at Lieb and Wight streets.

The Specialty Engineering Company, Detroit, has been incorporated with a capital stock of $5,000. The incorporators are M. A. Millard, Pontiac, and H. E. Walton and Harry M. Lau, Detroit. The new company proposes to engage in the manufacture of smoke consumers.

The Five Food Kernels Company, Dundee, Mich., manufacturer of breakfast foods, is preparing to establish a branch factory in Detroit. James Graham is general manager.

The Dean Machine Tool Company, Detroit, has been incorporated with $2,000 capital stock to manufacture tools and machinery. Kirk S. and Harold H. Dean are the principal stockholders.

The Board of Public Lighting Commissioners, Detroit, has decided to readvertise for bids for the 5000 kw. steam turbine and electric generator which is to be installed in the municipal lighting plant; $119,000 has been appropriated for betterments at the plant.

The Union Electric Products Company, Detroit, has been incorporated with $25,000 capital stock, to manufacture electric utensils. James D. Lamont and M. B. Duffield are the principal stockholders.

The General Aluminum & Brass Castings Company, Detroit, has filed amended articles of incorporation increasing its capital stock from $75,000 to $150,000.

The Jaiser Laundry, Detroit, has begun the erection of a new plant, 50 x 120 ft., one story, at Catherine and Riopelle streets.

The Muskegon, Ludington & Manistee Electric Railway Company, with offices at Muskegon, Mich., has been incorporated with a capital stock of $1,500,000, to build a line running from Muskegon to Manistee along the shore of Lake Michigan. Stockholders of the company are Thomas Jacobs, Walter Hieston, Henry K. Baldwin and Sidney N. Well, of Chicago; and Charles P. Williams, of Washington, D. C.

The Gile Boat Company, Ludington, Mich., is completing an addition to its factory to be used as a foundry. The addition is 50 x 100 ft. The company is planning to add some new lines to its products, including the manufacture of kerosene engines.

The Sturgeon River, Land & Development Company has been authorized by the Michigan Railroad Commission to issue $870,000 bonds and will soon start work on its hydroelectric plant on the Sturgeon River in Baraga County. J. K. Gronholf is the engineer in charge.

The plant of the Walsh Mfg. Company, Frederic, Mich., manufacturer of headings, was destroyed by fire June 30, entailing a loss of $50,000. No decision has been reached as to the rebuilding of the plant.

Partly as a result of the recent strike of machinists and boilermakers at the Pere Marquette Railroad shops at Grand Rapids and Saginaw, Mich., and partly because these cities are not centrally located as regards the Pere Marquette system, the company has practically decided to abandon its repair shops at both points. A large

part of the work will be done under contract at Chicago and Detroit, but the company is also considering the establishment of new shops at Ionia, Mich.

The John A. Roebling's Sons Company, announces the letting of a contract to the Worden-Allen Company, Chicago, for the construction of an addition to its wire mill at Dollar Bay, Wis. The new building is to be of steel and brick construction, 65 x 208 ft.

The White Marble Lime Company, Manistique, Mich., has begun the construction of a new shingle mill to replace that destroyed by fire last spring.

The Pierce-Budd Mfg. Company, Bay City, Mich., manufacturer of gasoline engines, is considering the removal of its plant to Detroit, with a view of enlarging the plant and increasing its business.

The plant of the New Process Steel Company, Marshall, Mich., was sold at receiver's sale July 10, to H. A. Hilis of that city. It is stated that the plant will be used as a branch factory of the Ames Palace Horse Car Company of Chicago.

The Kalamazoo Loose Leaf Binder Company, Kalamazoo, Mich., will build a $20,000 addition to its plant on West Kalamazoo avenue. The new building will be 73 x 100 ft., one story, and of reinforced concrete construction.

Indianapolis

INDIANAPOLIS, IND., July 15, 1913.

The Enterprise Foundry & Fence Company, Indianapolis, Ind., has been reorganized and incorporated with an authorized capital of $50,000. Those interested in the reorganization are H. I. Raymond, Jr., W. H. Holmes and W. S. Glass.

The Christie Machine Works, Indianapolis, Ind., has been incorporated by S. Kopf, J. A. Bawden and S. Christie.

The Shaw Aeroplane Company, Indianapolis, has been incorporated with $10,000 capital stock to manufacture aeroplanes. The directors are B. Russell Shaw, F. R. Horn and L. L. Bayer.

The Smelser Engine & Machine Works has obtained a tract of four acres from the Greater Indianapolis Industrial Association on which it will erect a fireproof factory building to contain approximately 12,000 sq. ft of floor space, Gas and gasoline engines, engine transmissions, and all kinds of traction devices will be the product of the company. Officers elected are E. G. Ritchie, president; James M. Smelsar, vice-president; Guy M. Churchill, secretary, and Noble H. Wible, treasurer.

The American Steel & Wire Company's plant at Anderson, Ind., is being enlarged.

Plans have been prepared for an addition to the plant of the Evansville Broom Company, Evansville, Ind.

A large coal property at Hartwell, Ind., involving about $100,000, has been bought by a syndicate of men from St. Louis who have plans for the re-equipment of mines already opened and the extensive development of the property.

The Travelers Insurance Machine Company has purchased a site at Anderson, Ind., and will build a factory for the manufacturing of vending machines.

The Falls Cities Motor Company, New Albany, Ind., has been incorporated with $50,000 capital stock to manufacture motor cars. The directors are Ferdinand Kahler, Sr., Orland E. South and Geo. R. Elder.

The Shimer Wire & Steel Company, Anderson, Ind., will build a plant at Evansville, Ind.

The Elwood Iron Works, Elwood, Ind., has increased its capital stock $100,000.

The capital stock of the Imbler Fence & Mfg. Company, Alexandria, Ind., has been increased $25,000.

Milwaukee

MILWAUKEE, WIS., July 14, 1913.

With the exception of a few shops, the producers in the Milwaukee district have slowed up considerably. It will probably be another month before normal production is again attained, and in the meantime advantage is being taken of the usual midsummer dullness to prepare for the fall. The milling machinery and other tool builders form an exception, shops such as Kearney & Trecker going at top speed and others running 85 to 90 per cent. In the heavy machinery and power equipment line the average run is 60 to 65 per cent. of normal. Automobile frame and parts makers are busier than they have been for a year. Order books show nothing unusual, but inquiries are freer and the prospects are for some good bookings in September and afterward.

The Allis-Chalmers Mfg. Company, Milwaukee, was awarded the contract for furnishing and installing a 12,000,000 gallon pumping engine in the North Point Station of the Milwaukee municipal waterworks system, at $74,200. The company was the only bidder, although the Bethlehem Steel Company, South Bethlehem, Pa., offered a bid which came in too late for consideration. The Allis-Chalmers Company has furnished practically all of the high duty pumping equipment for the Milwaukee system.

The Runkel Mfg. Company, Watkins Building, Milwaukee, has changed its name to the Adjustable Fixture Company. The company manufactures a line of electric and gas illuminating fixtures.

The Federal Pressed Steel Company, Milwaukee, has increased its capital stock from $50,000 to $150,000. The company's plant at Keefe avenue and North Pierce street, Milwaukee, is nearing completion and the original plans of organization contemplated the increase in the capital at the time operations were to be started.

The Milwaukee County board of supervisors has adopted the majority report of the committee on the new house of correction and will proceed with the construction of a group of buildings on a new site at North Milwaukee. The project will entail a total expenditure of $750,000. Oscar E. Schwemer is chairman of the board.

The Milwaukee-Western Cold Storage Company has been organized by J. J. Emery, John J. Foley and H. F. Friedrich, Jr., with an authorized capital of $300,000, to erect and operate a cold storage plant.

The Harley-Davidson Motor Company, Milwaukee, advises that its new factory, which is to be used for manufacturing a new style of motorcycle truck, is about completed and ready for the new machinery.

The Schlesinger interests of Milwaukee, operating iron mines in Wisconsin and Michigan, as well as coke and gas works at Milwaukee, have organized the Elkhorn Gas Coal Mining Company, a West Virginia corporation, with $200,000 capital, to operate in the West Virginia coal fields. Ferdinand Schlesinger, Charles D. Weeks, Henry J. Schlesinger and Edward Wilmer, all of Milwaukee, are the incorporators.

The board of trustees of the Stout Institute, Menomonie, Wis., now under control of the State, are considering plans for an addition to the manual training department to cost $50,000 with equipment. A $200,000 building program for 1914 and 1915 is also under consideration. Address, L. D. Harvey, superintendent.

An electric light and power plant will be erected at Green Lake, Wis., by the Green Lake Electric Company, which has been incorporated by James R. Stewart, L. Pynch and T. R. Duvall with an authorized capital of $10,000. The concern intends to serve the entire Green Lake country, which is filled with summer resorts.

Builders' hardware will be manufactured by the C. H. Driver & Kerr Company, Racine, Wis., which has just been incorporated for $25,000 by C. H. Driver and A. T. Kerr.

The Sterling Mfg. Company, of Racine, has been organized by George H. Shurr, E. L. Osborn and L. Powell with a capital stock of $10,000 to manufacture metal and woodenware specialties. A feature will be made of hardware specialty goods.

James Buelow, Fond du Lac, Wis., has established a shop at Racine to produce appliances and safety devices for aero and hydroplanes. Mr. Buelow recently disposed of a non-tipping device for planes to the Sloane Aeroplane Company, Chicago, for $15,000 and intends to perfect other important improvements and devices in the Racine shop.

Adam and Peter Blackwood have incorporated as the Racine Drop Forge Company, Racine, capital $20,000. The concern was organized two months ago and is now operating a job shop of considerable size.

Otto Beifeld and other well-known machinery and boiler interests at Watertown, Wis., have revived agitation for the establishment of a malleable iron foundry, projected by Milwaukee men last year. A public meeting has been called for July 18, at which time the proposition of forming a $100,000 corporation will be discussed. E. J. Vanderboom, Ernest Ward and Henry Kreitner of Milwaukee are assisting in the promotion of the enterprise.

The Klumb Engine & Machine Company, Sheboygan, Wis., organized by Paul Klumb, for many years secretary of the Globe Iron Foundry and other foundry and machine interests in central Wisconsin, is rushing

work on its plant on Saeman avenue. The plant consists of three buildings, as follows: Main shop, 100 x 100 ft.; pattern shop, 18 x 36 ft.; and power house, 30 x 40 ft. Next year it is intended to erect two additional buildings. The plant will be ready for operations about August 15. Gasoline engines and general machinery will be produced.

The Janesville 25,000 Club is negotiating with a manufacturer of springs and castings for farm machinery and agricultural implements to locate in Janesville. Nearly the entire output would be used in Janesville. A bond issue of $25,000 to provide funds for a shop building is a requirement. Frank Croak, F. E. Green and H. L. McNamara compose the factories committee of the club.

The Western Machine Mfg. Company, Eau Claire, Wis., has increased its capital stock from $40,000 to $70,000.

The F. S. Hoaglin Auto Company, Oshkosh, Wis., is making improvements to its garage and repair shop and will install more power equipment.

The E. & H. Motor Company, Sheboygan, Wis., has purchased a site at Ontario and Ninth streets, on which it will erect a $15,000 garage and repair shop.

The Universal Oxygen Company is the new corporate title of the American Gas Engineering Company, Sheboygan, which was organized early this year to build gasoline engines, machinery and to conduct a repair shop. The company has decided to devote most of its efforts to welding and cutting and will make a large installation of oxy-acetylene apparatus in the shops now under construction on South Fourteenth st. The intention to engage in internal combustion engine manufacture has not been abandoned, but will await developments.

Cleveland

CLEVELAND, OHIO, July 15, 1913.

Dealers report some improvement in the demand for machinery as compared with the previous week. They booked a fair volume of business, mostly in single tools. A better volume of inquiry for single machines is coming in. The demand for second-hand machinery is rather active. Calls for cranes are not numerous, but plants are well filled with orders. Some good business is in prospect for coal handling plant equipment. Makers of garbage disposal machinery are obtaining a good volume of orders and expect an increasing amount of business, owing to the fact that municipalities are showing more interest than formerly in the installation of garbage plants. The demand for steam engines which has been quiet for some time shows improvement. The report of the city building inspector of Cleveland shows that in the first six months of 1913 permits were taken out for 70 new factory buildings to cost $1,088,575.

The Big Four Railroad will enlarge its shops at Linndale, Ohio, a suburb of Cleveland, by the erection of a new car repair shop and an engine house. The general contract construction has been awarded to the H. A. Peters Company, Chicago. The structural iron work will be erected by the Sprague Iron Works, Chicago. Some woodworking machinery will be required. This will be purchased from the Cincinnati offices of the railroad.

Additional power plant equipment will be installed by the Plain Dealer Publishing Company, Cleveland. Orders have been placed for one 200 kw. and one 150 kw. Ball non-releasing gear, Corliss engine, which will be direct connected to Western Electric generators.

The American Iron Company, Cleveland, has been incorporated by A. J. Hall and others with a capitalization of $10,000 to manufacture architectural iron and metal forms.

The city of Cleveland, through W. J. Springborn, director of public service, will receive bids July 25 for transformers for the new municipal electric lighting plant and for electric meters for the electric lighting department.

A committee of business men of East Palestine, Ohio, has undertaken to sell $100,000 of the stock of the McGraw Tire & Rubber Company of that city. If its efforts are successful the company plans the erection of a large four-story factory extension.

The Vrooman Company, Bellevue, Ohio, has been incorporated with a capitalization of $10,000, by H. C. Stahl and others, to manufacture an onion weeder and topper.

The Youngstown Furnace Company, Youngstown, Ohio, whose plant was recently burned, has leased quarters in the Sennett Building near its old plant and will fit it up with machinery. The new shop will be placed in operation as soon as the equipment is installed.

Wagner Brothers, Canal Dover, Ohio, proprietors of a machine shop, have purchased the building and site of the Valley Foundry Company and the adjoining plant of the Runyon Machine Company in that city. Both the latter concerns recently went into bankruptcy. Wagner Brothers had planned to erect a large new shop but instead will occupy the factory buildings they have purchased.

Cincinnati

CINCINNATI, OHIO, July 14, 1913.

Not much interest is taken in the strike, now in progress, which includes practically all the molders and a large number of pattern makers in Cincinnati. Dull business conditions with the machine tool builders is, to a great extent, the reason for the apathetic feeling prevailing as to the outcome. Export business has declined, and, while there are a number of railroad orders in sight, this is practically the only source that can be expected to help out conditions at the moment. However, it is stated that a few scattered orders have been received lately from the South and West. Electrical equipment is also in poor demand, but midsummer is generally a slow season for manufacturers of this class of machinery. Second-hand machinery dealers are still complaining, although there is some business reported from different sources.

McWilliams & Schulte, Cincinnati, box manufacturers, will probably make some extensions to their plant at an early date.

The Acme Machine Tool Company, Cincinnati, recently received a Government order for five combination flat turret lathes, to be shipped to the Navy Torpedo Station, at Newport, R. I.

John Finn & Sons, Cincinnati, have let the contract for a combination wagon works and blacksmith plant to be erected at the corner of Charlton and Glendora avenues. The proposed building will be of brick construction, 50 x 85 ft., two stories.

The Cincinnati Foundry Company, Winton place, Cincinnati, whose formation was noted some time ago, expects to have its new plant in full operation before the fall season begins. All of the necessary equipment has been contracted for, with the exception of an air compressor and gas engine. The members of the new company are James B. Schumacher, George C. Euskirchen and J. S. Backer.

The new addition to the plant of the Hamilton Foundry & Machine Company, Hamilton, Ohio, is now nearly completed. It is 60 x 455 ft., one story, of brick and concrete construction. Practically all the necessary equipment has been purchased.

It is reported from a source usually considered reliable, that the Studebaker Corporation, Detroit, Mich., contemplates establishing a branch plant in Ohio. No details are yet available.

The Safe Cabinet Company, Marietta, Ohio, has increased its capital stock from $200,000 to $300,000, and as was recently reported, contemplates making an addition to its plant.

The Snider Mfg. Company, Logan, Ohio, is rebuilding its furniture manufacturing plant, destroyed by fire several months ago.

The Columbus Varnish Company, Columbus, Ohio, has let contract for a two-story factory addition to its plant.

The board of public affairs, Glouster, Ohio, will open bids July 19 for pumping and power equipment for a waterworks plant. A. Elliott Kimberly, Columbus, Ohio, has a copy of the specifications on file.

The Columbus Electric Company, Columbus, Ohio, has been incorporated with $50,000 capital stock. The principal incorporators are Charles E. Firestone and O. H. Perry, formerly officers of the Columbus Buggy Company, and it is rumored that the new company has plans under way for establishing a factory to manufacture electric runabouts. Details are not yet available.

The Heer Engine Company, Portsmouth, Ohio, has plans under way for an addition to its plant that will double its output.

A large addition is planned to the factory of the United States Playing Card Company, Norwood, Ohio. Small electric motors constitute the bulk of the machinery requirements.

The Sterling Paper Mill Company, Hamilton, Ohio, is remodeling its plant and will add considerable new paper mill machinery and power equipment.

The Central South

LOUISVILLE, KY., July 15, 1913.

While the machinery trade generally reports business as only fair, the boiler manufacturers are having an exceptionally good run, and are taking care of much more than usually falls to their lot at this season. This is a pretty good indication that manufacturing conditions in this territory are satisfactory. Pump men report a falling off in the demand, a good many waterworks projects which had been figured on not having developed as rapidly as had been expected. A fair demand for woodworking equipment is reported. Manufacturers whose business is largely in the South are paying much attention at present to the cotton crop situation. Thus far conditions in the Southwest, including Texas and Oklahoma, have been better than in the Central South, including Tennessee, Alabama and Mississippi, rain being badly needed in that section.

The Louisville Gas & Electric Company, recently organized by H. M. Byllesby & Co., to operate all of the local public utilities, has announced that a contract has been signed with the Standard Oil Company for the construction of a pipe line from the natural gas fields of West Virginia to Louisville. The work will be done for the Kentucky Pipe Line Company, a subsidiary of the Louisville Gas & Electric. Equipment for substations to be erected along the route will be needed. The purchases will be made by the Standard Oil Company in New York or Chicago, it is stated.

The Old Mission Furniture Company, Louisville, has increased its capital stock from $7,500 to $20,000, and will make improvements in its plant. Its address is Preston and College streets. C. Shaw is superintendent.

The McGrath Automatic Brake Company, Louisville, incorporated with $10,000 capital stock, is authorized to manufacture brakes and machinery. The incorporators are J. A. McGrath, R. H. Menefee and J. M. Scott. They state that definite plans for operation have not yet been made.

The plant and other property of the Ohio Falls Motor Company, an automobile concern in New Albany, Ind., opposite Louisville, have been sold to O. E. South, treasurer of the company, for $40,000. Mr. South and his associates plan to organize another company and operate the plant on a larger scale in the manufacture of a low-priced runabout.

The Ohio River Sand Company, Louisville, is establishing a branch plant and will need some equipment for handling and conveying sand. John M. Settle is general manager of the company.

The Louisville Gas & Electric Company, which recently began operations after having taken over all of the local utilities, is planning the installation of a series of central steam heating plants to serve the business district of the city. Boilers, pumps and other equipment will be needed. Gen. George H. Harries is president of the company.

The Speed Realty Company, Louisville, is considering plans for the erection of a $1,000,000 building between Third and Fourth streets and Walnut and Chestnut. It will be used by a department store, and will also contain a large theater. F. M. Sackett represents the company.

The American Metallic Packing Company, Lexington, Ky., is in the market for a used five-ton steam road roller.

L. H. Ramsey, Lexington, Ky., is in the market for electrical equipment for lighting a theater. The size of the plant will be about 50 hp.

The George W. Helm Company, Hopkinsville, Ky., is planning the erection of a large tobacco rehandling warehouse. A boiler, engine, pump and other equipment will be needed, besides woodworking equipment for the manufacture of hogsheads. Norman Mellon is manager of the company.

The Bluegrass Produce Company, Carlisle, Ky., is planning the erection of an ice factory. A separate company will be organized with $15,000 capital stock.

The Seagraves Machine Works, Pikeville, Ky., has been incorporated with $6,000 capital stock by Henry Seagraves, J. P. Mumaw and Vina Seagraves.

The city of Henderson, Ky., has undertaken plans for the erection of a $40,000 hospital.

The Kentucky Utilities Company, Lexington, Ky., is reported to have completed plans for the enlargement of its electric light plant at Pineville, Ky., which it recently purchased. Enough additional equipment will be installed to enable it to serve many of the coal mines in that territory. Address Manager Squires, Pineville.

The grass seed cleaning plant of E. F. Spears & Son, Paris, Ky., was destroyed by fire last week with a loss estimated at $50,000. It is stated that the company will rebuild, and that a reinforced concrete structure will be erected.

The South Covington & Cincinnati Street Railway, Covington, Ky., has purchased from the Westinghouse Electric & Mfg. Company a 300 kw. rotary convertor and a 300 kva. transformer for installation in a portable substation which it recently decided on.

The George Bohon Company, Harrodsburg, Ky., has plans for the erection and equipment of a carriage factory. The building will be 80 x 200 ft., and will be of brick and concrete construction. Davis T. and Hanley Bohon are managers of the company.

The Paducah Traction Company, Paducah, Ky., has plans for the immediate construction and equipment of a repair shop and is reported to be in the market for the necessary additional equipment.

The electric light plant at Oolitic, Ind., was recently damaged by fire to the extent of $5,000.

The Roberts & Conner Company, New Albany, Ind., has announced plans for the erection of a veneer mill in White County, Ark., where the company has purchased 850 acres of hardwood timberland. J. W. Conner will be in charge of the equipment of the plant.

The large glove and mitten plant of L. S. Fields & Son, Bloomington, Ind., was destroyed by fire July 9. The loss was $25,000. The plant will be rebuilt at once.

The Buckeye Spoke Company, Bon Aqua, Tenn., will establish an electric light plant in Centreville, Tenn., a nearby town, if a franchise which had been asked for is granted.

A. M. Bishop will establish a flour mill at Three Springs, Tenn., near Whitesburg. The cost of the equipment will be about $2,500.

I. A. Chase and others, Moscow, Tenn., are planning the organization of a company for the establishment of a terra cotta, brick and tile plant.

The Southern Coop Company, Nashville, Tenn., will establish a factory in that city for the manufacture of a folding chicken coop. Woodworking machinery will be the principal requirement.

Ellioplos & Tertepen, Chattanooga, Tenn., have purchased a site for the erection of a modern six-story hotel, the estimated cost of which is $100,000.

Nickey Bros. & Bass, Memphis, Tenn., have decided on the construction of a large veneer mill in that city, and will begin work on the plant at once. The Business Men's Club of Memphis has full details regarding the project.

The Saunders Mfg. Company, Roanoke, Va., has been incorporated to succeed W. H. Saunders, inventor and manufacturer of simplex wild turkey calls, and is in the market for automatic machinery, lathes, etc., for turning out rapidly the several parts. W. H. Saunders is president; H. T. Martin, first vice-president; R. J. Jackson, second vice-president, and J. M. Reynolds, secretary and treasurer. The office of the company, which also manufactures novelties, is at 134½ Salem avenue, S. W., Roanoke.

The Ryalls Machine Company, Inc., Charlottesville, Va., for business reasons has been reorganized, and under the name of the Ryalls Machinery Corporation will introduce among spinning mills the Ryalls reverse spindle motion machine, which has been successfully used in a number of mills for more than a year; also the Ryalls locking device and positive shrinkage drive for spinning mules. These devices are designed to lessen the difficulties of spinning and the imperfections in yarn.

Birmingham

BIRMINGHAM, ALA., July 12, 1913.

Inquiries are coming in briskly from cotton ginning plants and oil mills in anticipation of a large and early cotton crop. Gasoline engines are in demand. Business has recovered from the holidays, which were very brief this year, and many factories as well as mines and mills show a disposition to buy liberally in the near future. Present business is on a quiet basis, but fully up to normal for this season.

H. A. Turner and E. M. Durham, of Birmingham, and C. N. Wiley, of Ragland, have been appointed appraisers of the cement plant of the Atlantic & Gulf Portland Cement Company at Ragland, Ala. Reorganization plans are on foot and it is proposed to increase the capacity from 1000 to 1800 barrels. The plant was established two years ago at a cost of $1,000,000. The corporation has netted $7,000 monthly under the receivers, W. S. Lovell, H. C. Stiles and J. D. McQ. Carter.

The Ward-Weller Company, Gadsden, Ala., will enlarge its machine shops.

J. J. Hurlburt and Mr. Stouch are negotiating with the board of trade of Tuscaloosa, Ala., to establish a large paper mill adjacent to extensive lumber plants.

The city of Columbia, Ala., is negotiating with Robert Crawford, Dothan, Ala., with a view to operating the municipal electric plant by current generated at the McGriff water-power site. Address Joseph Baker, Mayor, Columbia, Ala.

The Marbury Lumber Company, Marbury, Ala., will establish a cotton ginnery.

The H. H. Hitt Lumber Company will rebuild a ginnery, planing mill and dry kiln at Falkville, Ala., recently destroyed by fire.

The Oneonta Oil & Fertilizer Company, Oneonta, Ala., has purchased the stock of the Oneonta Mill & Ginning Company and will add two gins to the plant.

The Motor Machine Company, Mobile, Ala., has been incorporated with a capital stock of $10,000 to operate a machine shop for the repair of automobiles, etc. W. D. Bellingrath, James A. Lewis and G. W. Morse are interested.

The A. & J. Mfg. Company, Gadsden, Ala., will increase the size of its stove factory about 50 per cent. Cleaning, molding and casting rooms are to be added.

The United States Board of Engineers has rejected the bids of the Mussell Shoals Hydroelectric Company and of C. E. James, Chattanooga, to erect hydroelectric power dams at Florence, Ala. Other bids will be invited. The estimated cost of this work on Tennessee River is $15,000,000.

The Export Phosphate Company is reported as about to establish a phosphate plant on 3000 acres in Polk County, Fla., recently purchased. A power plant of 1000 hp. is contemplated. The company was recently organized with a capital stock of $1,500,000. H. L. Peirce, Boston, Mass., is president. The address of the company is Bartow, Fla.

It is announced that the construction of an electric line between Jacksonville and St. Augustine, Fla., will be begun shortly. Canadian capital is interested. Address T. R. Osmond, St. Augustine.

The Mutual Gin Company at Midland, Ga., has been incorporated with a capital stock of $4,000 by B. C. Jenkins and others. It will establish a ginnery.

The Heard County Oil Mill & Fertilizer Company will remodel its plant at Franklin, Ga., and install machinery.

A municipal electric lighting system will be established at Milton, Fla. The Solomon-Norcross Company, Atlanta, Ga., are the engineers.

Winter Park, Fla., has issued $10,000 bonds for the installation of an electric light plant.

St. Louis

ST. LOUIS, MO., July 14, 1913.

In the machine tool market the past week there has been a reasonably fair inquiry for single tools and replacements, with some request for second-hand equipment, which still remains somewhat difficult to supply. Dealers are not in a pessimistic frame of mind, though not markedly enthusiastic over the situation. At the same time most of them look for improvement now that money is easing up in this territory as a result of the beginning of the movement of the crops.

The St. Louis Screw Company, St. Louis, has acquired two blocks of land upon which it plans to erect as soon as plans can be prepared a much larger factory, with more equipment than the present establishment.

The King Foundry Company, St. Louis, has increased its capital stock from $25,000 to $40,000 for the purpose of extending its capacity.

The plant of the Jacobi Art Glass Company, St Louis, was destroyed by fire Thursday July 10, with a loss of $30,000. It will be re-equipped.

The Western Foundry & Sash Company, St. Louis, has increased its capital from $10,000 to $35,000 for the purpose of extending its equipment and operations.

The Anheuser-Busch Brewing Association, St. Louis, will build a cold storage plant at Springfield, Mo., including a two-story, 100 x 143 ft. building with necessary equipment.

The Bowman-Blackman Machine Tool Company is now located in its new building at 1513 North Broadway, St. Louis.

The International Harvester Company announces plans for the construction and equipment of a large addition to its plant at East St. Louis, Ill., involving about $50,000 each for structure and equipment.

The City Water Company, of East St. Louis, has plans for improvements involving about $1,000,000 expenditure. Announcement is made that they will not be affected by the Kuhn receiverships in Pittsburgh, Pa., although it is one of the subsidiary companies. Charles M. Horner is superintendent.

The waterworks plant recently reported to be built at Hopkins, Mo., will be under the supervision of Heince, Kent & Lowry, engineers, of Kansas City, Mo.

Plans have been prepared for the equipment of a $15,000 waterworks plant at Maitland, Mo., under the direction of the mayor.

The Niangua Heights Development Company, Linn Creek, Mo., will build a hydroelectric plant. Plans are not quite completed. R. G. Scott is secretary of the company.

The Oak Orchard Mining Company, Joplin, Mo., has been incorporated with $20,000 capital stock by E. W. Hoffman, H. R. Snyder and J. H. Johnson and will shortly equip for operations.

H. H. Mace, of Mountain Grove, Mo., is reported as having plans for the construction of an electric light and power plant at Seneca, Mo.

An ice plant is planned to be equipped at Mt. Vernon, Mo., by J. T. Thurman, with about 10 tons daily capacity.

The Central Coal & Coke Company, Kansas City, Mo., is reported to have plans for a large sawmill in Texas with two bands and a horizontal re-saw, complete planing mill, steam drying equipment and equipment for mechanically handling lumber, etc.

C. C. Christie, Kansas City, Mo., recently reported as buying 4500 acres of coal land in Missouri, announces plans for equipment for 2000 tons daily output.

The electric light and power plant at Marshfield, Mo., has been bought by John E. Hosmer, who will remodel and improve and also add an ice plant.

The Wren Broom Mfg. Company, Joplin, Mo., has been incorporated with $15,000 capital stock by J. W. Wren, J. G. Starr and F. C. Ralston and will equip a plant at once.

The National Electric Construction Company, Kansas City, Mo., has been incorporated with $15,000 capital stock by H. P. Fisher, R. O. Wing and J. M. Deacy.

The power plant of the St. Clair County Gas & Electric Company at Belleville, Ill., blew up last week and considerable new equipment is reported needed.

The Out Put Glass Company, St. Louis, will establish a branch plant at Mt. Vernon, Ill., and will install manufacturing equipment as rapidly as possible.

The plant of the Central Box Board Company, Sterling, Ill., was damaged $40,000 by fire July 11. It is owned by Armour & Co. New equipment will be needed.

The Carter Glove Manufactory, Seymour, Ind., has completed plans for a plant at Alton, Ill., and a new corporation will be formed to handle the business, in which E. W. Brown, of Alton, will be associated.

The Car Works of Peoria, Peoria, Ill., has been incorporated with $50,000 capital stock by Geo. L. Fickenson, H. V. Finkelstein and Frank T. Miller and will equip a car-manufacturing plant soon.

The Hershfeld & Piper Foundry & Machine Company, Taylorville, Ill., has been incorporated with $30,000 capital by Geo. Piper, Robert Hershfeld and Charles J. Skelley and will begin operations at once.

The Warrensburg Canning Company, Warrensburg, Ill., has been incorporated with $100,000 capital stock by Charles J. and Charles D. Off and Samuel D. Wead. The company proposes to build a plant at once.

The Egyptian Timber Company, Mt. Vernon, Ill., has been incorporated with $24,000 capital stock by Charles A. Clark, John Fuhrer and Bernard K. Leach and will install mills shortly.

The Oreana Grain Company, Oreana, Ill., has been incorporated with $163,000 capital stock by M. C. Cooper, John Moothart and Grant Kirby. The company plans to erect elevators, etc.

The Mt. Olive Stave Company, Batesville, Ark., has plans for the enlargement and improvement of its mechanical equipment.

The Cate-Lanieve Company, Jonesboro, Ark., has been incorporated with $50,000 capital stock and will equip a cooperage plant. The stockholders are H. L. Lanieve, W. W. Cate and J. T. Slagle.

The plant of the Roseland Veneer & Packing Company of Roseland, La., recently burned with a loss of $60,000, will be rebuilt and re-equipped with the necessary machinery.

The commissioners of Road District No. 4, Pine Bluff, Ark., will improve a considerable mileage at once and is in the market, it is announced, for considerable necessary mechanical equipment.

The Boone County Telephone Company, Harrison, Ark., recently incorporated with $25,000 capital stock

will construct about 200 miles of line together and is in the market for considerable mechanical equipment for use in the work of construction.

The Oxford Telephone Mfg. Company, Fayetteville, Ark., recently incorporated, is in the market for the necessary equipment for the manufacture of dry cell batteries, cross arms and other telephone equipment.

The Trumann Cooperage Company, St. Louis, Mo., has plans for a single band saw mill at Trumann, Ark.

An ice plant with 25 tons daily capacity will be built and equipped at Dermott, Ark., by D. G. Bryant and others.

The Kelley Lumber Company, Searcy, Ark., will build a mill at Wheetley, Ark., on plans already completed.

The Dermott Gin Company, Dermott, Ark., recently reported incorporated, will proceed at once with the equipment of a ginnery. The machinery will cost about $5000.

The Allin Machine Works, Helena, Ark., calls attention to an error made in *The Iron Age* of July 3 in the statement that that company will change its name to the Modern Machine Works. Its name has not been changed and will not be.

The Impson Valley Oil & Gas Company, Hugo, Okla., recently incorporated with $25,000 capital stock by Ed L. Reed and others, announces that it is in the market for drilling and other necessary equipment for the development of its properties.

R. F. Dempsey, R. E. Bledsoe and J. C. Short, of Marlow, Okla., have incorporated the Everybody's Gin Company with $15,000 capital and will equip a ginnery at once.

The Roff Oil & Cotton Company, Roff, Okla., has been incorporated with $50,000 capital stock at Roff, Okla., by T. R. Cole and E. A. Talley and others and will equip a cotton seed oil mill at once.

James P. Addiston, D. Padrick and J. L. Bruce, of Coalgate, Okla., have incorporated the Coalgate Ice & Cold Storage Company, with $15,000 capital stock and will equip a plant.

A cotton gin will be built and equipped at Waurika, Okla, by the Ryan Cotton Oil Company of that place.

James A. Jones of Chickasha, Okla., has plans for the installation of presses for stamping patented iron and tin devices and is in the market for the necessary machinery.

The White Swan Steam Laundry Company, McAlester, Okla., has acquired a site and will equip a large laundry plant.

The Yargan Naval Stores Company, Gulfport, Miss., has plans for the improvement of its plant, replacing engines with turbines, installing direct connected dynamos, etc.

The Wright Stave Company, Ripley, Miss., will build an additional plant at Dumas, Miss., soon.

The Interstate Petroleum Company, Colcord Bldg., Oklahoma City, Okla., is in the market for equipment for the extraction of gasoline from natural gas.

Plans are being prepared for a $30,000 waterworks plant at Louisville, Miss., by J. E. Baskerville, of Birmingham, Ala. Mayor W. J. Newton, Louisville, is in charge.

The Como Cotton Compress Company, Como, Miss., has increased its capital stock from $40,000 to $50,000 for the purpose of adding equipment.

The Burton-Schwartz Cypress Lumber Company of Burton, La., is reported to have plans by M. L. Rhodes, of New Orleans, and W. L. Burton and S. G. Schwartz, of Burton, La., to build a band saw mill with 40,000,000 ft. annual capacity.

The Southwestern Traction & Power Company, New Orleans, La., has been incorporated with $3,000,000 capital stock, by Jules Godchaux, Sol Wexler and Lawrence Blum with plans for the construction and equipment with power houses, etc., for an interurban railroad connecting Lafayette, New Iberia, Abbeville, Alexandria and other points.

An electric lighting plant and waterworks are planned to be installed at Melville, La., by the municipal authorities, the town clerk being at present in charge of negotiations.

The Van Beuthuysen Lumber & Tin Company, New Orleans, La., has been incorporated with $100,000 capital stock, by Walter Van Benthuysen, Charles G. Wolfe and Benjamin J. Toomer and will equip for operations at once.

The city of Rayville, La., has formally voted to expend $20,000 in the installation of a waterworks plant. Present plans are under the direction of the town clerk.

Charles A. Smith, New Roads, La., is reported as having plans for the construction and equipment of a $100,000 sugar refining plant on his plantation.

Texas

AUSTIN, TEXAS, July 12, 1913.

The machinery and tool trade continues active in Texas and the Southwest, dealers reporting larger sales than at this time a year ago. Prospects are favorable for a continuation of satisfactory business the remainder of the summer, with every indication that there will be a big increase in the demand for various lines of machinery this fall.

The Marfa Light & Ice Company will install an auxiliary electric light and power plant at Marfa, Texas.

The Llano Milling Company will install a new filtering plant and make other improvements to its waterworks system which supplies the town of Llano, Texas, with water.

The San Benito Ginning Company is erecting a new cotton gin at Edinburg, Texas.

The Gulf, Colorado & Santa Fé Railroad Company will build additional machine shops and make other improvements to its division terminals at Temple, Texas, at an aggregate cost of about $85,000. Plans for the proposed improvements have been approved.

The Ford Motor Company, Detroit, has purchased a site at Houston for a large five-story assembling plant. The building will be brick, fireproof construction, 125 x 300 ft.

The Co-operative Gin Company will erect a cotton gin at Sadler, Texas. Harvey Eldridge is interested.

The Gulf, Colorado & Santa Fé Railroad has let the contract for the construction of a planing mill, dry kiln and three transfer pits at its shops at Cleburne, Texas, to the Drake-Brannum Construction Company, Fort Worth, for approximately $60,000.

The tax-payers of Hillsboro, Texas, have voted favorably on the proposition of issuing $25,000 of waterworks and sewer bonds. The contract for extending the systems will be let as soon as the bonds are disposed of.

The Memphis Cotton Compress Company's new cotton compress, now being erected at Memphis, Texas, will have a daily capacity of 1500 bales. The plant will cost about $35,000.

A new cotton compress is being erected at Timpson, Texas, at a cost of $30,000. It will be finished in time to handle this season's crop.

The Mexican Eagle Oil Company has begun the erection of its oil refinery near Tampico, Texas. The plant will cost more than $2,000,000, it is stated.

The city of Belton, Texas, has issued $20,000 of bonds for improving the waterworks plant.

The American Stone Company, Floyds Knobs, Ind., will establish a large plant at Mexia, Texas, for the manufacture of whetstones and polishing stones. It will also erect a stone reduction plant.

The Texas Traction Company will soon begin the erection of its large shops near Trinity Heights, in Dallas. The company is now erecting an electric substation near the site of the proposed shops.

The Monte Cristo Ginning Company is erecting a cotton gin at Monte Cristo, Texas. George Hamman is interested.

The Home Brewing Company has been organized for the purpose of establishing a brewery at Shiner, Texas. J. C. Blohm is interested.

The Moore & Sames Warehouse & Cold Storage Company will erect a cold storage plant at Cuero, Texas. C. B. Moore is interested.

The Moulton Water Works Company will construct a waterworks plant and distributing system at Moulton, Texas. F. T. Fehrenkamp is interested.

The Buda Gin Company will erect a cotton gin at Buda, Texas. Will G. Barber is interested.

The Beaumont Hardwood Manufacturing Company has been organized at Beaumont with a capital stock of $50,000. The incorporators are M. Guiterman, H. A. Perlstein and Lip Norvell.

The United Fuel & Power Company has been organized at Wichita Falls, Texas, with a capital stock of $30,000. The incorporators are John W. Dyson, Andrew Urban and C. E. Menzie.

The Scholten Bros. Cedar Company, which recently finished the construction of a railroad from Lometa, Texas, to its cedar forest lands, 25 miles, has increased its capital stock from $125,000 to $135,000, and will make improvements in its cedar sawmills.

The General Petroleum Company is preparing to develop its oil lands in the section around Tampico, Mexico, on an extensive scale. It will also erect an oil refinery and lay a system of pipe lines. F. J. de Sabla, Jr., Los Angeles, Cal., is president.

An appropriation of $2,000,000 has been made by the City Council of Tampico, Mexico, for the construction

of extensions and improvements to the waterworks system and for other purposes.

The Southern Wells Sales Company, Beaumont, Texas, which has been incorporated with a paid-up capital stock of $100,000, has taken over the business of the Southern Well Works Company in Texas and Louisiana and will continue the business with increased stock and manufacturing facilities. J. F. Lucey is president of the new corporation, Neal Lucey is vice-president, and C. H. Emrick is secretary-treasurer.

The Pacific Coast

PORTLAND, ORE., July 8, 1913.

Business in metal working equipment has slowed down somewhat of late, and few orders of any importance are coming out. There is plenty of figuring, but sales are scattering and rather small, improvements of special importance being quite generally held up for the present. The demand for mill and logging equipment is beginning to reflect the unsatisfactory condition in the lumber market, as orders are withheld on many contemplated improvements. Dealers in these lines however are getting a very fair volume of small business. The lumber trade is dull, and prices have dropped off, leaving little profit for the mills, as logs are held at the old prices. There has been a general closing down of logging camps in this district, which will not resume work until August 1, and a great deal of machinery is being repaired and replaced during the idle period. Some buying is reported for various development projects, but much of this business also has been delayed, and orders of any consequence are scarce. Mill owners anticipate a brisk revival in the lumber trade as soon as the tariff question is settled.

Work will be started about August 1 on Portland's first municipal dock, which will cost about $300,000, and will be equipped with numerous freight-handling devices, including a cargo mast and a power-operated ramp.

The Lidgerwood Mfg. Company, which does an extensive business in logging equipment in this territory, has opened a warehouse with a large stock of machinery at 809 Western avenue, Seattle, Wash.

The city of Seattle, Wash., has let the contract for the completion of the Cedar River dam, at a figure of $687,110.

The city of Tacoma, Wash., has purchased a milling machine for the city machine shop.

The Copalis Lumber Company announces that it will build a shingle mill at Hoquiam, Wash., with 10 upright Sumner shingle machines.

An active demand for harvesting and grain-handling machinery is reported in the interior of Oregon and Washington. The Walla Walla Iron Works, Walla Walla, Wash., notes a large increase for the season in all lines of agricultural machinery, and several other shops at that place are very busy.

The Issaquah & Superior Coal & Improvement Company, Seattle, Wash., announces that extensive improvements will soon be made at its mine, including a large screening and washing plant, new drilling equipment, etc.

The town of Oregon City has placed a contract with the Oregon Bridge & Construction Company for the construction of a municipal elevator, to cost $11,980. The structure will consist of a steel frame tower, with a large hydraulic passenger elevator.

The Skagit Power Company, Bellingham, Wash., has applied for permits to build hydroelectric plants on the Skagit and Cascade rivers, expecting to develop about 27,500 hp.

John Anderson is installing a new machine shop at Sedro Woolley, Wash.

The Barber Lumber Company, Boise, Idaho, is figuring on several important improvements, including the construction of a railroad from the Barber mill into Boise Basin.

The Doty Lumber & Shingle Company, Dryad, Ore., is preparing to shut down next month for the installation of new machinery.

The National Mfg. Company, San Francisco, Cal., is planning the erection of a two-story factory building at Richmond, Cal., for the manufacture of novelties and ornamental fixtures in wire and brass and for plating, brazing, aluminum and brass foundry work.

The Denver & Rio Grande Railroad Company is rebuilding the part of its shops at Salt Lake City, Utah, which was recently destroyed by fire.

The University of Utah, Salt Lake City, Utah, is preparing plans for a foundry building to replace one recently destroyed by fire. The new structure will be fireproof, of brick and iron and will cost approximately $5,800.

Eastern Canada

TORONTO, July 12, 1913.

The Kipawa Power Company, Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by W. A. J. Case, J. B. Taylor and others.

The Rigaud Edwater Syndicate, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by G. L. Alexander, Herbert Hughes and others to develop gas and electric systems.

The Canadian Metal Mfg. Company, Ltd., Montreal, has been incorporated with a capital stock of $30,000 by F. W. Montgomery and John K. Wells, Boston, Mass., and others to manufacture heating and ventilating apparatus and sheet metal goods.

The British American Nickel Corporation, Ltd., Toronto, has been incorporated with a capital stock of $20,000,000 by Robert Gowans, Joseph Ellis and others of Toronto, to develop nickel mines.

The Toronto hydroelectric power commissioners have decided that the city must have an auxiliary steam plant which will cost approximately $1,000,000. The plant will be located on the water front, in order to receive coal by water as well as by rail. The Provincial commissioners, it is expected, will sanction the arrangement for power for the pumping station on the understanding that a steam plant will in future be provided.

H. M. Isaacs, secretary-treasurer of the Beck Duplicator Company, New York, has secured an option on property in Berlin, Ont., for the purpose of erecting a Canadian branch in the near future.

The Canadian Abrasive Wheels, Ltd., Dundas, Ont., has been incorporated with a capital stock of $500,000 by H. E. Sherk, G. R. Harvey and others of Dundas, Ont., to manufacture abrasive materials.

The Consolidated Brick & Tile Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by F. J. Foley, T. A. Silverthorn and others of Toronto, to manufacture brick, tile, earthenware, etc.

The Balsam Lake Quarries, Ltd., Toronto, has been incorporated with a capital stock of $60,000 by Martin Grahame, J. F. Verner and others to quarry stone, and to manufacture cement.

The Crookstone Stone Company, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by J. A. Jelly, L. E. Allen and others to quarry limestone, granite, etc.

The R. H. Goodday & Co.'s lumber mills at Scotts Junction, 30 miles from Quebec, were destroyed by fire. The loss will be over $60,000, fully covered.

The plant of Clatworthy & Sons, manufacturers of electrical fixtures, King street West, Toronto, was badly damaged by fire. The loss will be about $10,000.

Fire destroyed the large plant of the Point Edward Elevator Company, Point Edward, Ont. The loss is estimated at about $400,000, which includes the building and the grain stored in it.

It is rumored that the Grand Trunk will build large car shops at Bridgeburg, Ont. Vice-president Kelly paid a visit to Fort Erie recently and it is said that he gave instructions for plans to be prepared for the new shops.

Contracts have been let by the Hydroelectric Commission for the work of construction and equipment at Wasdell's Falls, where the commission will undertake its initial project in the generating of its own power. Contracts were also let for the extension of the Dundas, London and St. Thomas stations, and for the construction of the Prescott transformer station. The work on all the contracts is to commence immediately.

The rate-payers of Galt, Ont., passed a by-law to raise $70,000 by debentures to make extensions to the waterworks system.

The grist mill and sawmill belonging to Joseph Warren, South Branch, Kent County, N. B., were totally destroyed by fire.

The large elevator at Meaford, Ont., owned by the Meaford Elevator Company, has been burned.

The Robert Mitchell Company, Montreal, is erecting a large foundry.

Plans are being prepared for a factory to be built by the Oil Motor & Mfg. Company at St. John, N. B.

Plans are being prepared for the erection of a plant by the Dennis Wire & Iron Works, London, Ont., to cost $20,000.

Searle & Lamson, Ltd., Fredericton, N. B., will build a large refrigeration and cold storage plant.

The American Cyamid Company, Niagara Falls,

Ont., will build an extensive plant of structural steel, reinforced concrete, and brick tile, from plans which are being prepared by Westinghouse, Church, Kerr & Co., New York City. The plant will be comprised of the following buildings: Carbide building, 110 x 144 ft.; cyamid building, 91 x 390 ft.; hydrating and granulating building, 110 x 229 ft.; cooling building, 85 x 110 ft.; liquid air building, 60 x 120 ft.; wash house, 40 x 97 ft.; coke dryer building, 42 x 91 ft.; lime kiln building, 50 x 115 ft.; lime nitrogen silos, 56 x 56 ft.; laboratory, 31 x 81 ft.; store house, 40 x 80 ft.; raw material bins, 26 x 53 ft.; and other miscellaneous buildings; also an office building, 31 x 81 ft. The plant will be equipped for electric operation by Niagara Falls power.

The Gravenhurst Iron Specialty Company is having plans prepared for a new factory which it will erect at Grimsby, Ont., this summer.

Western Canada

WINNIPEG, July 12, 1913.

General trade and industrial conditions in western Canada are gradually improving, the improvement in the grain crop having stimulated confidence in the outlook. The financial tightness is still a drawback, and it looks as if there would not be much betterment in that respect this year. It is understood that some of the Western municipalities will delay works that they had intended carrying out this season. There is a fairly good demand for machinery, but the movement is not so active as at the corresponding time last year. Numerous orders for machinery parts are being placed by different manufacturing concerns.

The Regina Clay Products Company, Ltd., Regina, Sask., is being organized for the manufacture of brick, tile, etc.

The Canadian Swift Company, Ltd., meat packer, is building a large warehouse at Victoria, B. C., to be equipped with freezers, coolers, power, etc. It will cost about $55,000.

The United Farmers, of Alberta, Calgary, are planning to build a grain elevator at Cereal, Alberta.

The Duck Lake Milling Company, Duck Lake, Sask., will build a 200-barrel flour mill.

Kerr & Adams, Humboldt, Sask., will increase the capacity of their woodworking plant by the addition of new machinery.

E. B. Greenshields, Montreal, president of the Pacific Coal Fields, Ltd., Fergie, B. C., announces that the present output of 300 tons per day will be increased to 4000 tons per day in the fall.

The Mountain Park Coal Company, Ltd., headed by C. J. Heyland, of Edmonton, Alberta, is planning to increase the daily capacity of the mine from 95 tons per day to 2000 tons. Considerable machinery is being installed.

H. M. E. Evans, president Pembina Coal Company, Ltd., Edmonton, announces that the capacity of the plant will be increased from 210 tons per day to 1500 tons.

A new plant, capable of mining 1000 tons per day, is being installed at the property of the Gainsford Collieries, Ltd., 40 miles west of Edmonton.

The Hardy Bay Lumber Company, Ltd., Hardy Bay, B. C., will erect a sawmill and shingle mill to manufacture the timber on its 3000 acres. The capacity of the sawmill will be about 25,000 ft. per day, and that of the shingle mill about 45,000. The president of the company is R. S. Hamilton.

The Vancouver Timber & Trading Company, Ltd., Vancouver, B. C., has plans completed for a modern sawmill of large capacity on the north shore of Burrard Inlet, B. C. It is said the plant will have a capacity of 60,000,000 ft. per annum, and will be electrically operated throughout.

James Drake, Abbotsford, B. C., is erecting a sawmill of 25,000 ft. daily capacity at Ardley Station, B. C. He will also install a plant to produce 100,000 shingles per day.

The rate-payers of Port Arthur, Ont., have passed a by-law to grant concessions to the elevator and flour mill to be established by Davidson & Smith. The contract for the elevator has been let to the Barnett-McQueen Company, Port Arthur and Fort William at $358,000.

The "X" Tenn Mfg. Company, Regina, Sask., has been organized with a capital of $150,000 to manufacture grain drying bins. It is claimed that sufficient orders are already on hand to keep the plant busy for 15 months.

O. J. Sorby, of Grand Forks, North Dakota, and George H. Westwood, Medicine Hat, Alberta, will erect a cold storage warehouse and creamery at Medicine Hat, to cost about $25,000.

The Hammond Stooker Company will build a factory in Redcliff, Alberta, for the manufacture of grain shockers. The factory will cost $75,000.

The Harkness Flour Milling Company, Carman, Man., contemplates the erection of a mill at Taber, Alberta, having a capacity of 200 barrels per day.

The Medicine Hat Pump & Brass Mfg. Company, Medicine Hat, Alberta, will erect a factory to cost $50,000.

J. A. Hollingshead contemplates the erection of a cement products plant at Medicine Hat, Alberta.

The Phoenix Tractor Company, Eau Claire, Wis., contemplates the erection of a tractor factory in Moose Jaw, Sask.

William Rutherford and M. N. Merrian have entered into a contract with the city of Medicine Hat, Alberta, to construct a woodworking and planing mill to cost $16,000.

Government Purchases

WASHINGTON, D. C., July 12, 1913.

Bids will be received at the office of the United States Reclamation Service, Los Angeles, Cal., until July 21, for one vertical pumping unit, consisting of a screw pump with a capacity of 20 second ft., mounted vertically; one vertical pumping outfit, consisting of a pump with a capacity of 20 second ft., mounted verscrew pump with a capacity of 10 second ft., and one vertical pumping unit, consisting of a screw pump with a capacity of 5 second ft. Address O. H. Ensign, consulting engineer.

Bids will be received at the office of the general purchasing agent of the Isthmian Canal Commission, Washington, D. C., until July 29, for a forging press.

The Isthmian Canal Commission will also soon be in the market for the purchase of six 5-ton pillar cranes. These cranes are needed for handling forgings between furnaces and hammers and under the latter. No operating gear is required, except that the trolleys shall be operated from the floor by pendant chains.

The bureau of Supplies and Accounts, Navy Department, Washington, opened bids July 8 for supplies for the navy yards as follows:

Schedule 5571—Ordnance

Class 11, Washington—One electric conveyor—Bid 35, $2,700.

Schedule 5575—Construction and Repair

Class 21, Portsmouth—One horning press—Bid 8, $508, alt.; 16, $448; 26, $995 and $977, alt.; 29, $501 and $495, alt.; 32, $500 and $495, alt.; 42, $275.50 and $400, alt.; 45, informal.

Class 22, Portsmouth—One geared open-back power press—Bid 8, $1,090; 16, $1,096; alt.; 29, $1,078 and $1,058, alt.; 32, $1,068 and $1,058; 42, $700; 45, informal.

Schedule 5576—Steam Engineering

Class 31, Portsmouth—One emery grinder—Bid 16, $36.80; 18, $47; 26, $41.75 and $43.80; 29, $38; 32, $30 and $35; 46, $83; 51, $45.45.

Class 32, Portsmouth—One column shaper—Bid 16, $297 and $361; 18, $437, $467, and $462; 26, $372.80; 29, $394; 32, $345; 43, informal; 51, $384 and $512.50.

Class 33, Portsmouth—One engine lathe—Bid 16, $448 and $508; 18, $722; 26, $753.30 and $678.30; 29, $825; 32, $480 and $570, alt.; 35, $808; 38, $525; 43, informal; 51, $667, $760, and $587.

Class 34, Portsmouth—One upright drill—Bid 16, $84; 18, $197; 26, $69.90; 29, $74; 32, $88; 34, $110; 35, $75; 51, $87 and $115.

Class 36, Brooklyn—One high-pressure positive blower—Bid 20, $1,988; 29, $1,425; 40, $1,666 and $1,600, alt.; 44, $1,145 and $2,123, alt.

Following is a list of the bidders whose numbers are found with the bids given above:

8. E. W. Bliss Company. 16. Frevert Machinery Company. 18. Fairbanks Company. 20. General Electric Company. 26. Kemp Machinery Company. 29. Manning, Maxwell & Moore. 32. D. Nast Machinery Company. 34. National Contracting Company. 35. Niles-Bement-Pond Company. 38. Rahn-Larmon Company. 40. P. H. & F. M. Roots Company. 42. D. H. Stoll Company. 43. Springfield Machine Tool Company. 44. B. F. Sturtevant Company. 45. Toledo Machine Tool Company, informal; no guarantee. 46. Valley City Machine Works. 51. Prentiss Tool & Supply Company.

The daily consular reports issued by the Bureau of Foreign and Domestic Commerce contain foreign trade opportunities, abstracts of a few of which follow:

No. 11,265—An American consular officer in the Far East reports a demand for machinery for sinking artesian wells, and that if water is found in sufficient quantities additional machinery will be required. The consular officer suggests that catalogues of well-drilling machinery be forwarded to the consulate general for reference purposes.

No. 11,266—An American citizen residing in a South American country desires to get in touch with manufacturers of street-sweeping machinery and other appliances in the United States with a view to demonstrate their usefulness in that country.

No. 11,267—A merchant in a European country desires to purchase machines for making chains, also apparatus for welding by electricity. Catalogues, price list, weight of machinery, and other information should be forwarded. The correspondence may be in English.